

Chilton's Food Engineering

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In this issue:
ENGINEERED FOODS

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Capital Spending Report

ALSO:

"Islands" of Automation
How R&D Copes With Marketing
Sweeteners Report

Chilton's Food Engineering



ABOUT THE COVER

Capital spending can sometimes be a risky matter because, really, you're placing a bet on the future. *Food Engineering's* Capital Expenditures Report reveals what food companies are thinking about the future.

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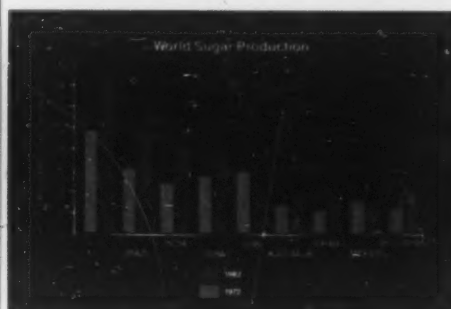
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CAPITAL EXPENDITURES REPORT



BILL DRENNIX, Senior Editor

Capital spending for the top 50 food firms was down slightly in '83, reflecting the national trend for all manufacturing. But, spending increased by 9% for the top ten food companies.

At first glance, 1983 appears to be a stagnant year for capital spending in the food and beverage industry. Overall spending was down 2.6% to \$7.5 billion from \$7.7 billion in 1982, according to the Department of Commerce. But then total manufacturing capital spending was down 1.7% to \$310.9 billion from \$316.4 billion in '82, so a decrease for the food industry was no surprise.

However, spending was increased 6.0% by the top ten spending food firms to \$2.37 billion from the \$2.24 billion those firms spent in 1982. Total spending for the top 50 decreased 0.2% from \$4.93 billion to \$4.92 billion this year. While net profits for the top 50 were \$5.33 billion — only \$4.1 billion higher than capital spending. Spending amounts almost equal to net profits, food companies do not appear hesitant to upgrade and replace property, plants and equipment or to initiate new projects. And, spending these amounts in a year riddled with high interest rates is a sure sign that these companies are determined to maintain and improve their assets. With mergers, takeovers, and leveraged buyouts seeming to loom around every corner, it's imperative for all companies to preserve their value.

The food industry as a whole appears to be cash rich. Money seems to be plentiful for stock repurchase plans and acquisitions, as well as maintaining capital expenditure levels.

The recession is over, but the strong dollar, coupled with high interest rates is probably holding back any surges in capital spending. However, most of those companies reporting

(Continued on next page)

SPENDING REPORT

estimates for the coming year, did project equal or higher capital expenditures for '84. If foreign currencies begin to stabilize against the dollar, as projected, the strong economy could bring a dramatic increase in capital spending.

Continued concentration

Continued merger and acquisition activity continues to dramatically consolidate the food industry. This year's figures include R.J. Reynolds' purchase of Heublein, Esmark's buy-out of Norton-Simon, and Campbell Taggart's merger with Anheuser-Busch. Not reflected in the figures are some more recent events. Within the past year Beatrice bought Esmark, Nestle is taking over Carnation. Pillsbury is acquiring Van de Camp's, and R.J. Reynolds is purchasing Sunkist. The Esmark acquisition will make Beatrice the sales leader in the food industry, displacing General Foods. The Nestle/Carnation deal will create yet another U.S. giant. Nestle already has world revenues of \$13.3 billion. The Carnation acquisition will create U.S.-based revenues of well over \$5 billion. In May, 1980, *Food Engineering* asked whether the top 50 firms would control the food industry by the year 2000. If the present trend of mergers and acquisitions continues, that number could be reduced to a dozen.

The 50 firms listed here account for 66% of all food and beverage industry capital spending. They also account for 46% of total food industry sales — \$132 billion out of the \$287.5 billion cited by the Department of Commerce.

Capital spending is again dominated by the beverage industry. Anheuser-Busch, Coca-Cola and PepsiCo went one, two and three, spending almost a billion dollars amongst them. With CPC International (corn sweeteners) at number seven, Philip Morris (Miller Brewing) at number eight, and Coors at number eleven, the beverage industry is leading the field in expansions, and additions to property, plants and equipment. And apparently the spending is paying off. Profits at Anheuser-Busch rose almost 22% to \$346.2 million and sales rose 30% to \$6.2 billion. Coke's profits are up over half a billion on sales of about \$6 billion. And, Pepsi's profits are up 21% to 212.1 million with sales of \$5.4 billion.

The top ten spenders averaged an increase in net profits of 11.6%. Overall, the top fifty spenders averaged an increase in net profits of 4.8% (a total increase of \$243.1 million). While capital spending by no means guarantees an instant profit, the long range effect of productive capital spending is undeniable. Continual improvement of property allows continual improvement in productivity. Unlike expenditures for Marketing and R&D, where results are unquestionable, but not necessarily quantifi-

able, results of capital spending *can* be measured. Productivity comparisons to other plants or systems or equipment *can* be made. And, the purchased property or equipment *can* be depreciated.

What \$4.9 billion bought

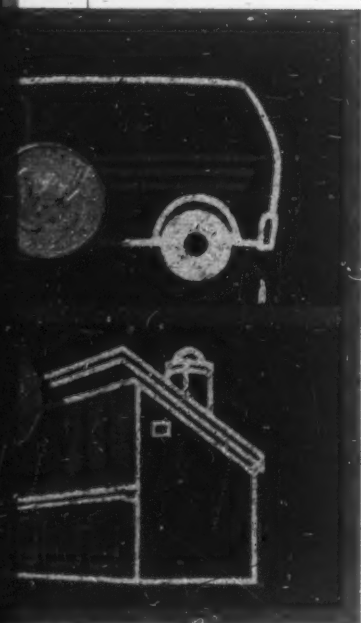
Where did all the money go this year? Number one, Anheuser-Busch spent \$348.1 million for beer and beer-related operations alone with the balance being spent on food products and diversified operations. Major expenditures by the company's brewing subsidiary include the expansion of the Balswinesville, New York, and Houston, Texas breweries, as well as expenditures designed to improve productivity at all breweries. In addition, a major capital investment was made by Busch Agricultural Resources for the expansion of the Manitowoc, Wisconsin malting facility. In the food group, expenditures include Campbell Taggart's purchase of bread delivery trucks and for bakery modernization and productivity improvement programs; Busch Industrial Products expansion of the St. Louis, Missouri and Bakersfield, California yeast plants; and construction by Eagle snacks of potato and tortilla chip lines at its North Carolina plant.

Besides expanding bottling capacity, and productivity improvement programs, Coca-Cola Foods Division has invested over \$20 million in additional aseptic production equipment, including a major expansion at the Division's Faw Paw, Michigan plant. The added production capability will allow the Division to expand its product line of aseptically packaged drinks to more flavors of Hi-C, as well as to other juices and juice-containing beverages.

At PepsiCo, the major portion of 1983 expenditures was devoted to increased distribution capabilities, capacity expansion and the upgrading of existing facilities. The Frito-Lay division opened its first corn storage facility in the Midwest and began construction on a new snack food production plant in Casa Grande, Arizona. Frito-Lay also installed precise and versatile weighing and packaging machines at several production facilities.

General Foods' Oscar Mayer Division opened a single-product plant to produce bacon at Coshocton, Ohio. Plans have been announced to build a single-product hot dog plant in Columbia, Missouri and the purchase of a plant in Sigourney, Iowa, for producing processed turkey products. The company also added Orowheat bakery and distribution facilities.

Nabisco Brands began construction of a new Corporate Technology Center in East Hanover, New Jersey, expected to be completed during 1985. The company is planning to upgrade productivity throughout their confectionery



Anheuser-Busch spent \$348.1 million on beer and beer-related operations alone in 1983.

manufacturing plants. The hot cereal plant in Minneapolis, Minnesota was modernized, as well as the Milk-Bone plant in Buffalo, New York. In Canada, Nabisco installed modern automated palletizers at the Christie Brown bakeries, and purchased computer facilities. Overseas, the company began a modernization program at their newly-acquired Huntley & Palmer group in Britain.

CPC International is on the move. Having spent over \$187 million in 1983, the company is planning to invest more than \$300 million annually over the next three to five years. CPC plans to take advantage of new technology available in corn wet mulling and to continue major expansion of its grocery products business. CPC purchased a plant at Schaumburg, Illinois, to expand production of Thomas' English muffins.

In 1984, construction will begin on a mayonnaise and related products plant in Bayonne, New Jersey, and two other mayonnaise plants at Lerma, Mexico and Pilar, Argentina. At Duppigheim, France, CPC built a modern plant for Knorr soups, sauces and bouillons. CPC's German affiliate entered the wheat processing field with the start-up of a new plant at Zulpich, Germany. The company's largest corn wet milling facility at Mogi-Guaçu, Brazil was expanded. In the coming year, production capacity at the Winston-Salem, North Carolina corn wet milling plant will be expanded by 50%. And the company's Argo, Illinois plant will be completely rebuilt at an accelerated rate over the next five years, at a cost of over \$300 million.

Campbell's new facilities

Campbell Soup completed an \$8 million state-of-the-art mushroom growing facility in Dublin, Georgia. Construction began on a \$9 million Le Menu production line at the Sumter, South Carolina frozen food plant. The Pepperidge Farm division completed two new cookie production lines at the Willard, Ohio plant. And, began two more at the Downingtown, Pennsylvania facility. The Vlasic Foods division renovated the Imlay City, Michigan pickle plant. For 1985, the company plans to focus on new technology in containers and packaging.

Philip Morris completed the Miller brewing Trenton, Ohio brewery. The company also acquired bottling operations for the Seven-Up Company in Ottawa, Toronto and Boston.

Kellogg's is in the process of completing a major, advanced-technology cereal plant in London, Ontario, Canada. Similar technological renovations are taking place at manufacturing facilities in the U.S., Great Britain, Australia and Brazil. The company's newest plant in Seoul, South Korea began production

RANKING OF TOP SPENDERS

Company	1983	1982	1981	1980	1979
Anheuser-Busch	1	1	1	1	1
Coca-Cola	2	6	3	4	3
PepsiCo	3	4	7	2	2
General Foods	4	7	10	6	12
Nabisco Brands	5	5	8	17	22
R.J. Reynolds	6	17	21	18	25
CPC International	7	8	5	5	11
Campbell Soup	8	12	16	10	9
Philip Morris	9	3	4	3	4
Kellogg's	10	15	14	12	21
Adolph Coors	11	25	13	14	—
ConAgra	12	45	38	42	—
Archer-Daniels-Midland	13	11	2	7	33
H.J. Heinz	14	20	17	16	13
General Mills	15	14	19	22	10
Nestle	16	22	—	—	—
Beatrice Foods	17	9	11	8	7
Procter & Gamble	18	19	30	21	15
Carnation	19	27	23	49	20
Hershey Foods	20	18	20	28	29
Dart & Kraft	21	16	18	11	16
Borden	22	30	29	27	8
Consolidated Foods	23	13	12	9	14
Pillsbury	24	29	28	32	6
Seagram	25	23	24	26	34
Ralston Purina	26	10	9	20	5
Swift Independent	27	—	—	—	—
IT&T	28	26	26	29	28
A.E. Staley	29	2	6	19	36
The Federal Co.	30	—	46	39	43
Agway	31	—	—	—	—
McCormick	32	48	—	—	—
IC Industries	33	33	34	41	41
G. Heileman Brewing	34	49	35	37	—
General Cinema	35	36	—	—	—
Esmark	36	—	—	—	—
United Brands	37	39	25	33	31
American Brands	38	41	—	—	49
Anderson Clayton	39	37	32	41	37
Castle & Cooke	40	50	40	40	27
Gerber	41	—	42	50	17
MEI	42	35	—	—	—
Formost-McKesson	43	44	41	45	38
American Home Products	44	—	—	—	—
Universal Foods	45	—	50	—	—
Central Soya	46	40	39	—	39
Lipton	47	—	—	—	—
International Multifoods	48	46	44	46	47
Tyson Foods	49	43	43	—	—
Montfort of Colorado	50	—	—	—	—

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SPENDING REPORT

Anheuser-Busch St. Louis, MO

	1983	1982	% Change
Capital Expenditures	402.9	335.5	20.1
Net Sales	6,228	4,771	30.5
Net Earnings	346.2	284.2	21.8

Estimated 1984 Spending: \$388 million

Capital expenditures included the expansion of the Baldwinsville, NY, and Houston, Tex. breweries, expansion of the Manitowoc, Wisc. malting facility and Campbell Taggart's bakery modernization.

Coca-Cola Atlanta, GA

	1983	1982	% Change
Capital Expenditures	262.7	249.5	13.3
Net Sales	5,980	4,516	32.4
Net Earnings	511.5	446.6	14.5

Estimated 1984 Spending: N.A.

Coke's capital expenditures related primarily to capacity expansion and improved efficiency. Over \$20 million has been invested in aseptic production equipment for Hi-C drinks.

PepsiCo Purchase, NY

	1983	1982	% Change
Capital Expenditures	273.9	278.0	-1.5
Net Sales	5,370	5,232	2.6
Net Earnings	212.1	174.9	21.3

Estimated 1984 Spending: Expected to increase.

Frito-Lay opened its first corn storage facility in the Midwest and began construction on a new snack food production plant in Casa Grande, Ariz.

General Foods White Plains, NY

	1983	1982	% Change
Capital Expenditures	266.7	232.9	14.5
Net Sales	8,600	7,227	19.0
Net Earnings	317.1	272.4	16.4

Estimated 1984 Spending: About the same.

General Foods completed an Oscar Mayer bacon plant at Coshocton, Ohio, purchased a plant in Sigourney, Iowa, for producing processed turkey products, and added Orowheat bakery and distribution facilities.

Nabisco Brands New York, NY

	1983	1982	% Change
Capital Expenditures	240.9	266.6	-9.4
Net Sales	5,985	5,871	1.9
Net Earnings	322.6	314.7	2.5

Estimated 1984 Spending: \$300 million

Began construction on a new Corporate Technology Center in East Hanover, N.J. Began a modernization program at Huntley & Palmer in Britain. Upgrading productivity throughout confectionery manufacturing plants.

R.J. Reynolds Winston-Salem, NC

	1983	1982	% Change
Capital Expenditures	206.0	118.0	74.6
Net Sales	4,491	3,156	42.3
Net Earnings	200.0	51.0	292.1

Estimated 1984 Spending: N.A.

R.J. Reynolds used capital spending for modernization of food and beverage processing facilities.

CPC International Englewood Cliffs, NJ

	1983	1982	% Change
Capital Expenditures	187.4	216.6	-13.5
Net Sales	4,011	4,092	-2.0
Net Earnings	136.2	231.6	-41.2

Estimated 1984 Spending: Up to \$300 million.

Constructed a plant at Dupigheim, France for Knorr soups, sauces and bouillons. Expanded oil refining capacity at Anastacio in Brazil. Purchased a plant at Schaumburg, Ill. for production of Thomas' English muffins.

Campbell Soup Co. Camden, N.J.

	1983	1982	% Change
Capital Expenditures	183.1	154.0	18.9
Net Sales	3,657	3,292	11.1
Net Earnings	191.2	165.0	15.9

Estimated 1984 Spending: N.A.

Completed an \$8 million mushroom growing facility in Dublin, Ga. Began a \$9 million Le Menu production line at the Sumter, S.C. frozen food plant. Completed two Pepperidge Farm cookie production lines at Willard, Oh., and two at Downingtown, Pa.

Philip Morris New York, NY

	1983	1982	% Change
Capital Expenditures	174.6	286.3	-39.1
Net Sales	3,572	3,459	3.3
Net Earnings	99.9	174.9	-42.9

Estimated 1984 Spending: About the same.

Completed Trenton, Ohio brewery for Miller beer. Acquired bottling operations in Ottawa, Toronto and Boston for the Seven-Up Company.

Kellogg Battle Creek, MI

	1983	1982	% Change
Capital Expenditures	156.7	121.1	29.4
Net Sales	2,361	2,397	-0.7
Net Earnings	242.7	227.8	6.5

Estimated 1984 Spending: \$200 million

Constructing an advanced-technology cereal plant in London, Ontario. Completed Seoul, South Korea cereal plant. Constructing new corporate headquarters in Battle Creek, Mich.

Coke has invested over \$20 million in aseptic production equipment for its Hi-C division.

Figures are in millions of dollars and are for food segments only.

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SPENDING REPORT

Adolph Coors Golden, CO

	1983	1982	% Change
Capital Expenditures	155.7	84.1	85.1
Net Sales	1,110	766	44.9
Net Earnings	89.0	33.0	169.7

Estimated 1984 Spending: \$150 million

Expanded brewery to service continued market expansion. Constructed a composite packaging facility. Acquired a grain processing facility. Added a potato chip production line at The Food Factory.

ConAgra Minneapolis, MN

	1983	1982	% Change
Capital Expenditures	152.8	24.1	534.0
Net Sales	1,459	1,151	26.7
Net Earnings	28.7	20.6	39.3

Estimated 1984 Spending: \$165 million

Completed an expansion at Peavey Grain's storage and handling facilities at the Tulsa port of Catoosa. Constructing an export grain elevator at Kalama, Wash. Expanded the Oakland flour mill. Completed flour mill in Phoenix.

ADM Decatur, IL

	1983	1982	% Change
Capital Expenditures	147.7	160.5	92.0
Net Sales	4,292	3,713	15.6
Net Earnings	110.2	155.0	-28.9

Estimated 1984 Spending: N.A.

Completed a major co-generation project at the Clarksdale, Miss. plant. Increasing the size of the hydroponics complex in Decatur, Ill.

H.J. Heinz Pittsburgh, PA

	1983	1982	% Change
Capital Expenditures	137.0	111.4	23.0
Net Sales	3,954	3,738	5.8
Net Earnings	237.5	214.3	10.8

Estimated 1984 Spending: N.A.

Completed expansion at Holland, Mich. pickle factory. Expanded Star-Kist tuna processing facilities at Caribe, Puerto Rico and Samoa. Updated equipment at Ore-Ida Greenville, Mich. plant. Completed expansion of Hübinger's HFCS production facility.

General Mills Minneapolis, MN

	1983	1982	% Change
Capital Expenditures	130.3	123.8	5.3
Net Sales	2,713	2,793	-2.9
Net Earnings	130.7	134.1	-2.5

Estimated 1984 Spending: \$135 million

Seven-story consumer foods warehouse at Lodi, California, utilizing computers and robots.

Nestle' White Plains, NY

	1983	1982	% Change
Capital Expenditures	127.1	93.0	36.7
Net Sales	2,508	2,341	7.1
Net Earnings	113.4	93.7	21.0

Estimated 1984 Spending: N.A.

Increased frozen food production capacity at Trenton, Canada and the Stouffer factory at Gaffney. Equipped the New Milford factory for the production of Chambourcy desserts.

Beatrice Foods Chicago, IL

	1983	1982	% Change
Capital Expenditures	119.0	211.0	-43.6
Net Sales	7,304	7,285	0.3
Net Earnings	292.1	320.8	-9.0

Estimated 1984 Spending: Expected to increase.

Used capital expenditures to upgrade food and beverage production facilities.

Procter & Gamble Cincinnati, OH

	1983	1982	% Change
Capital Expenditures	116.0	103.0	12.6
Net Sales	2,249	2,192	2.6
Net Earnings	58.5	66.5	-12.0

Estimated 1984 Spending: Expected to increase.

Capital expenditures were directed towards cost-saving projects and projects to increase capacity.

Carnation Los Angeles, CA

	1983	1982	% Change
Capital Expenditures	107.9	74.8	44.3
Net Sales	2,778	2,836	-2.1
Net Earnings	155.0	137.6	12.6

Estimated 1984 Spending: N.A.

Installed a multiple vapor recompression evaporator system at the Riverbank, Calif. tomato processing plant to reduce energy consumption and increase production capacity. Built a new plant in Othello, Wash. for processing dehydrated re-fried beans.

Hershey Foods Hershey, PA

	1983	1982	% Change
Capital Expenditures	105.2	116.7	-9.9
Net Sales	1,706	1,566	8.9
Net Earnings	100.2	94.2	6.4

Estimated 1984 Spending: \$100 million

Completed a 435,000 square foot Eastern Distribution Center. Added production capacity to Friendly's Wilbraham, Mass. location. Installed San Giorgio pasta manufacturing lines.

PepsiCo's Frito-Lay division began construction on a new snack food plant in Casa Grande, Arizona.

Figures are in millions of dollars and are for food segments only.

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SPENDING REPORT

Dart & Kraft Glenview, IL

	1983	1982	% Change
Capital Expenditures	95.3	119.9	-20.1
Net Sales	6,660	7,041	-5.4
Net Earnings	252.8	198.7	27.2

Estimated 1984 Spending: Expected to increase
Capital expenditures went for improved efficiency and replacement of existing facilities.

Borden New York, NY

	1983	1982	% Change
Capital Expenditures	94.6	61.1	54.8
Net Sales	2,969	2,891	2.7
Net Earnings	118.6	117.2	1.2

Estimated 1984 Spending: \$N.A.

Installed Lite-line snack manufacturing facilities in five plants. Completed construction of a Creamette pasta plant at Tolleson, Ariz. Modernizing Houston, Tex. milk plant.

Consolidated Foods Chicago, IL

	1983	1982	% Change
Capital Expenditures	76.2	128.4	-40.7
Net Sales	3,336	3,186	4.7
Net Earnings	78.6	90.5	-13.1

Estimated 1984 Spending: N.A.

Acquired the Jimmy Dean Meat Co. and Poultry Specialties. Upgraded equipment.

Pillsbury Minneapolis, MN

	1983	1982	% Change
Capital Expenditures	73.2	65.8	11.2
Net Sales	2,489	2,204	12.9
Net Earnings	83.5	79.6	4.9

Estimated 1984 Spending: \$88 million

Constructing a new production facility for Haagen-Dazs ice cream in Tulare, Calif. and a vegetable processing plant in Mexico. Completed the Los Angeles flour mill expansion.

Seagram Montreal, Canada

	1983	1982	% Change
Capital Expenditures	68.3	90.2	-24.3
Net Sales	2,648	2,826	-6.3
Net Earnings	119.4	111.3	7.3

Estimated 1984 Spending: N.A.

Seagram is using capital expenditures to modernize production facilities.

Ralston Purina St. Louis, MO

	1983	1982	% Change
Capital Expenditures	66.8	177.5	-72.4
Net Sales	3,966	3,962	0.1
Net Earnings	211.1	180.8	16.8

Estimated 1984 Spending: \$85 million

Capital expenditures went for new and improved facilities. Constructing new feed plants.

Swift Chicago, IL

	1983	1982	% Change
Capital Expenditures	59.0	17.3	241.0
Net Sales	2,540	2,540	0.0
Net Earnings	22.0	22.0	0.0

Estimated 1984 Spending: N.A.

Expanded operations at the Des Moines, Iowa boxed beef plant. Acquired a lamb plant in San Angelo, Tex. Acquired three pork plants from Armour Food Co.

ITT New York, NY

	1983	1982	% Change
Capital Expenditures	56.0	77.0	-24.7
Net Sales	1,472	1,458	1.0
Net Earnings	38.2	31.0	23.2

Estimated 1984 Spending: N.A.

Completed new Pomona, Calif. bakery. Also made expenditures to reduce fuel consumption, and increase production and operating efficiencies.

The Federal Co. Memphis, TN

	1983	1982	% Change
Capital Expenditures	51.4	43.4	18.5
Net Sales	1,304	1,123	16.1
Net Earnings	41.4	25.7	60.9

Estimated 1984 Spending: \$43 million

Completed a pie filling manufacturing plant for Globe Products, a new Holly Farms feed mill in Nacogdoches, Texas and increased capacity at White Lily Foods for packaged flour.

A.E. Staley Decatur, IL

	1983	1982	% Change
Capital Expenditures	50.4	321.9	-84.4
Net Sales	1,679	1,588	5.7
Net Earnings	13.7	62.6	-78.1

Estimated 1984 Spending: \$70 million

Constructing a new soybean plant in India. Capital expenditures also went for sweetener bulk handling stations at Cocoa, Fla., Butler, N.C., and Westborough, Mass.

General Foods' Oscar Mayer Division opened a single-product plant to produce bacon at Coshocton, Ohio.

Figures are in millions of dollars and are for food segments only.

(Continued on page 105)

SPENDING REPORT

Agway Syracuse, NY

	1983	1982	% Change
Capital Expenditures	37.9	40.2	-6.7
Net Sales	1,676	1,958	-14.4
Net Earnings	9.7	11.0	-11.8

Estimated 1984 Spending: \$35 million

Capital expenditures went for nominal and recurring items, commitments for plant construction, and expansion and replacement of worn-out facilities.

McCormick Hunt Valley, MD

	1983	1982	% Change
Capital Expenditures	37.2	22.4	66.1
Net Sales	743	718	3.5
Net Earnings	40.1	25.0	60.4

Estimated 1984 Spending: N.A.

Completed a new technical center at Hunt Valley, Md. Constructing a major production facility at Hunt Valley.

IC Industries Chicago, IL

	1983	1982	% Change
Capital Expenditures	36.2	36.8	-1.7
Net Sales	1,536	1,589	-3.3
Net Earnings	50.8	26.9	88.8

Estimated 1984 Spending: \$43 million

Installed processing systems in the Old El Paso plant. Pet has invested in automated waffle ovens and computer-controlled automated equipment for manufacturing and packaging Whitman's candies.

G. Heileman La Cross, WI

	1983	1982	% Change
Capital Expenditures	33.8	21.5	57.2
Net Sales	1,326	1,001	32.5
Net Earnings	57.0	45.7	24.7

Estimated 1984 Spending: \$30 million

Completed a major expansion of the brewhouse and government cellars at the St. Paul brewery, an addition to the packaging and warehousing areas at the Seattle brewery.

General Cinema Chestnut Hill, MA

	1983	1982	% Change
Capital Expenditures	33.2	31.6	5.1
Net Sales	524	496	5.6
Net Earnings	60.1	28.6	110.1

Estimated 1984 Spending: \$30 million

Upgraded and modernized Pepsi bottling facilities.

Esmark Chicago, IL

	1983	1982	% Change
Capital Expenditures	30.9	16.9	82.8
Net Sales	1,685	1,446	16.5
Net Earnings	35.7	21.7	65.5

Estimated 1984 Spending: N.A.

Capital expenditures were used to increase production efficiency and capacity.

United Brands New York, NY

	1983	1982	% Change
Capital Expenditures	30.1	42.8	-29.7
Net Sales	2,406	3,973	-39.4
Net Earnings	-167.0	2.7	N.A.

Estimated 1984 Spending: N.A.

Upgraded palm oil extraction equipment in United Fruit plants. Improved productivity in remaining Morrell meat plants.

American Brands New York, NY

	1983	1982	% Change
Capital Expenditures	28.9	27.1	6.6
Net Sales	798	697	14.5
Net Earnings	37.9	31.6	19.9

Estimated 1984 Spending: \$34 million

Capital expenditures were geared to the continuing modernization of manufacturing operations and packaging equipment.

Anderson Clayton Houston, TX

	1983	1982	% Change
Capital Expenditures	28.3	30.6	-7.5
Net Sales	1,525	1,603	-4.9
Net Earnings	38.5	55.2	-30.3

Estimated 1984 Spending: N.A.

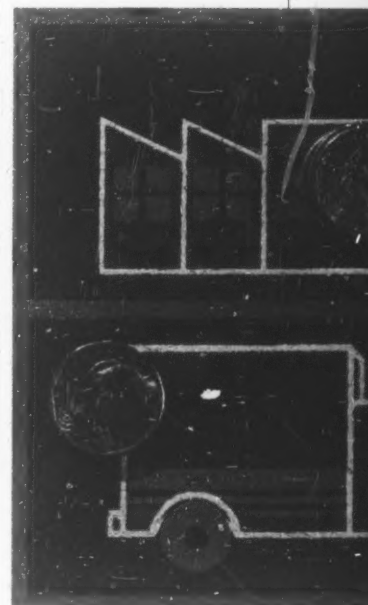
Anderson Clayton concentrated capital expenditures on increasing productivity and lowering operating costs.

Castle & Cooke Honolulu, HI

	1983	1982	% Change
Capital Expenditures	27.5	21.0	31.0
Net Sales	1,552	1,687	-8.1
Net Earnings	-49.7	8.7	N.A.

Estimated 1984 Spending: \$21 million

Capital expenditures were used to maintain modern equipment and increase productivity.



Nabisco Brands began construction of a new Corporate Technology Center in East Hanover, New Jersey.

Figures are in millions of dollars and are for food segments only.

(Continued on next page)

SPENDING REPORT

41 Gerber Fremont, MI

	1983	1982	% Change
Capital Expenditures	27.5	15.9	73.0
Net Sales	677	623	8.7
Net Earnings	46.6	39.0	19.5

Estimated 1984 Spending: \$28 million

Completed 1983 expansion of baby food plant in Fremont, MI. Also, completed expansion of baby food plant in Fremont, MI.

42 M&M Corp. Minneapolis, MN

	1983	1982	% Change
Capital Expenditures	25.8	33.1	-22.1
Net Sales	616	503	22.5
Net Earnings	38.3	32.0	19.7

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Minneapolis, MN. Also, completed expansion of baby food plant in Minneapolis, MN.

43 Forrest-McKesson San Francisco, CA

	1983	1982	% Change
Capital Expenditures	24.3	32.2	-24.5
Net Sales	1,193	1,193	0.0
Net Earnings	31.2	33.3	-6.4

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in San Francisco, CA. Also, completed expansion of baby food plant in San Francisco, CA.

44 American Home New York, NY

	1983	1982	% Change
Capital Expenditures	24.0	19.4	23.7
Net Sales	854	817	4.5
Net Earnings	65.4	62.0	5.5

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in New York, NY. Also, completed expansion of baby food plant in New York, NY.

45 Universal Foods Milwaukee, WI

	1983	1982	% Change
Capital Expenditures	23.9	19.6	21.9
Net Sales	523	496	5.4
Net Earnings	20.6	18.4	12.0

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Milwaukee, WI. Also, completed expansion of baby food plant in Milwaukee, WI.

46 Central Soya Fort Wayne, IN

	1983	1982	% Change
Capital Expenditures	23.4	27.1	-13.7
Net Sales	1,513	1,753	-13.7
Net Earnings	24.3	19.5	24.6

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Fort Wayne, IN. Also, completed expansion of baby food plant in Fort Wayne, IN.

47 Lipton Englewood Cliffs, NJ

	1983	1982	% Change
Capital Expenditures	22.2	17.6	26.1
Net Sales	1,006	913	10.2
Net Earnings	64.5	56.6	14.0

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Englewood Cliffs, NJ. Also, completed expansion of baby food plant in Englewood Cliffs, NJ.

48 Int'l Multifoods Minneapolis, MN

	1983	1982	% Change
Capital Expenditures	20.1	23.1	-13.0
Net Sales	1,033	1,078	-4.2
Net Earnings	29.9	33.9	-11.8

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Minneapolis, MN. Also, completed expansion of baby food plant in Minneapolis, MN.

49 Tyson Foods Oklahoma City, OK

	1983	1982	% Change
Capital Expenditures	19.9	25.3	-21.3
Net Sales	604	559	8.1
Net Earnings	11.1	9.4	18.1

Estimated 1984 Spending: N.A.

Completed 1983 expansion of baby food plant in Oklahoma City, OK. Also, completed expansion of baby food plant in Oklahoma City, OK.

50 Montfort Greeley, CO

	1983	1982	% Change
Capital Expenditures	17.9	6.0	196.3
Net Sales	1,326	997	33.0
Net Earnings	16.1	18.9	-14.8

Estimated 1984 Spending: \$10 million

Completed 1983 expansion of baby food plant in Greeley, CO. Also, completed expansion of baby food plant in Greeley, CO.



CPC International is planning to invest \$300 million annually over the next three to five years.

KING SUGAR: STILL NO.1, BUT LOSING GROUND

Corn sweeteners score dramatic gains, sugar loses ground, low-cal sweeteners will take a bigger share of market from both. Needed, says USSPG: Renewal of sugar price supports in the face of subsidized imports, removal of foreign barriers to U.S. exports.



World sugar prices are among the most volatile of all commodities. Repeated attempts to control violent price swings through effective international agreements have failed.

Sugar will continue to be the most important sweetener during the coming decade, but it will continue to lose ground."

That's one conclusion of an economic study entitled "The U.S. Sweetener Industry In The Decade Ahead," prepared for the domestic sweetener industry by Economic Perspectives, Inc. and presented Aug. 2 by Dr. William C. Motes of EPI at the International Sweetener Symposium at Itasca, Ill.

The symposium marked the first gathering of the U.S. Sweetener Producers Group, a coalition of sugar and corn-sweetener producers. Membership includes cane and sugarbeet growers and processors, corn growers and processors, trade unions and suppliers to the sweetener industry. Basic goal: Influencing government policies aimed at supporting the U.S. sweetener industry in the face of subsidized imports at home and export barriers abroad.

HFSC: Soaring market share

More than 12 million tons of nutritive sweeteners are currently consumed in the U.S. per year. About 80 percent of this is in processed food products.

Corn sweeteners and low-calorie sugar substitutes are replacing growing amounts of sugar (sucrose) in processed foods—especially soft drinks—but sugar will remain the most important sweetener in the American diet in the decade ahead, says the EPI report.

While U.S. per-capita consumption of sweeteners grew from 124.2 lbs. in 1975 to 132.9 lbs.

in 1983 and will further rise to 148 lbs. by 1992, sugar's share of market plunged from 72 percent in 1975 to 53 percent in 1983 and will further dip to 42 percent by 1992. High-fructose corn syrup (HFCS) accounts for most of the change, soaring from only 4 percent share of the sweetener market in 1975 to 23 percent in 1983, with projected rise to 31 percent by 1992.

Chaotic world market

Because the U.S. is the world's fifth largest producer and second-largest importer of sugar, Motes pointed out, the commodity is critical to both producers and consumers in this country.

World sugar prices are among the most volatile of all commodities. Repeated attempts to control violent price swings through effective international agreements have failed. The fourth International Sugar Agreement (ISA), negotiated in 1977, failed to hold sugar prices within targeted range mainly because the European Economic Community (EEC) didn't join. This agreement expires at the end of this year, but recent negotiations for a new ISA failed. Major reason: Exporters are unwilling to restrict exports sufficiently to insure stable prices.

In addition, The General Agreement on Tariffs and Trade (GATT), designed to prevent unfair export subsidies and dumping by suppliers such as the EEC, has not been effective.

Most nations intervene in the sugar market to insulate producers and consumers from the instability of world prices, the EPI report points out. For example:

out. For example:

—All major exporters guarantee minimum prices to their producers;

—Most control both exports and amounts available for domestic consumption;

—Some exporters prohibit sweetener imports;

Both exporters and importers restrict imports through tariffs.

U.S. policy for many years has been to protect producers from abnormally low world prices and consumers from abnormally high world prices. This is accomplished through raw-sugar price supports (in the form of CCC loans, at no cost to the taxpayer) and through imports restrictions (in the form of duties and quotas) to support domestic sugar prices above extreme lows in world prices.

But the basic pattern for most other world producers has been to subsidize production, create surpluses, then subsidize export of their surpluses.

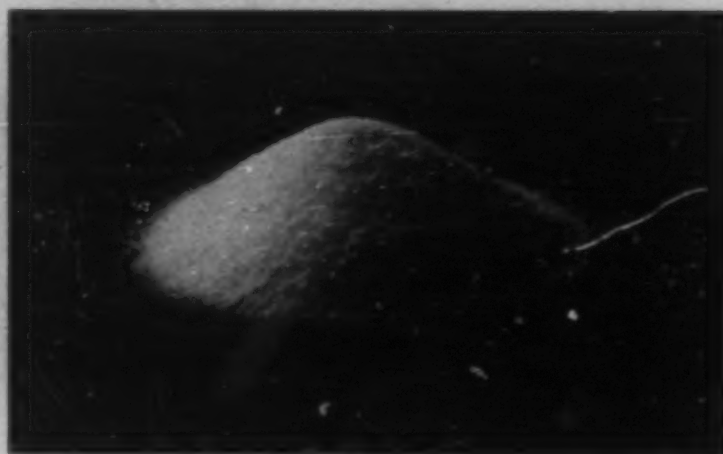
The EEC—now the world's largest exporter—guarantees producer prices, applies prohibitive levies to imports (except for limited amounts from former colonies), and subsidizes exports to a price below the cost of production. In June, the EEC subsidized sugar exports to the tune of 14.2 cents per lb.—*nearly three times the world market price that month!*

Both the EEC and Japan restrict HFCS production. Centrally-planned economies such as Cuba have even tighter controls.

Except for the most efficient cane-sugar producers, the U.S. produces sugar at lower cost than most of the world's sugar exporters. But—with world prices driven to artificially-low levels by nations who subsidize exports—the U.S. can't compete in world markets. Example: While U.S. sugar-production costs range between 20 and 25 cents per lb., the world market price for October delivery (as this story went to press) was 4.14 cents per lb. As a result, all sugar produced in this country is for domestic consumption only.

Protectionism abroad has only further spurred production. While world sweetener consumption grew by 19 percent over the past 10 years, world production soared by 31 percent. Among the major sugar producers, only in the U.S. did sugar acreage decline over the past decade. "Such expansion in the face of declining price tends to further destabilize world markets," says the EPI report. In 1983 and '84, nearly all free-market exports were sold below production costs. "If U.S. prices are not effectively stabilized during low world-price periods, domestic sugar production can be expected to decline sharply," the report adds.

Outlook for world sugar markets, according to the EPI report: Slow adjustment from cur-



rent surpluses, with production and consumption near balance by 1987, but a return to surplus production and downward pressure on prices once again by 1992.

Since an effective ISA is unlikely over the next few years, the policies of individual nations will "continue to intensify the disruptive price cycles that have long characterized the world sugar market."

The outlook for sweeteners in the U.S. is dominated by two trends, says the EPI report: A sharp upward surge in beverage consumption, and a decline in home-sweetener use. But the overall sweetener trend is up, with per-capita consumption projected at 148 lbs. in 1992 from 132.9 lbs in 1983.

As this total rises, competition for share of market will intensify between nutritive and low-calorie sweeteners, and between sugar and starch-based sweeteners. While the domestic sweetener market will increase from 15.7 mst (million short tons, refined basis) to 18.5 mst by 1992, the market for sugar will slowly decline.

Although sugar production is declining, overall sweetener production is on the increase because of the growth of HFCS. Reasons: Lower production costs for HFCS; price-stabilization policies which—if continued—will lead to further erosion of sugar production.

Outlook for domestic sweeteners: Turbulent world markets; intense competition; a larger, more competitive and more efficient U.S. sweetener industry.

Little effect on retail prices

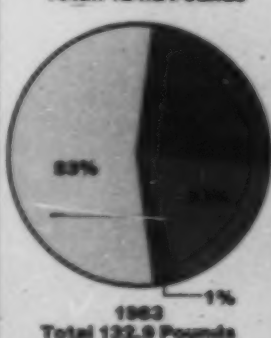
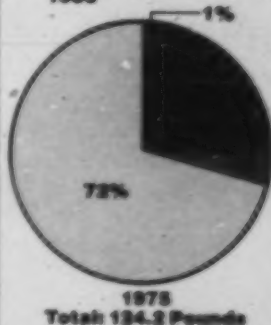
USDA manages the U.S. sugar program in such a way that domestic prices give processors strong incentives to redeem any CCC loans for commercial sale.

Critics sometimes charge that this holds domestic prices unnecessarily high. If the price

(Continued on next page)

The U.S. is the world's fifth largest producer and second largest importer of sugar. The commodity is critical to both producers and consumers in this country.

Per Capita Sweetener Consumption 1975 and 1983



■ Other Caloric
■ Noncaloric
■ HFS
■ Glucose/Dextrose
■ Sugar

Ingredients/Sweeteners

While world sweetener consumption grew by 19 percent over the past 10 years, world sugar production has soared by 31 percent. Such expansion in the face of declining price further destabilizes world markets.



support were lowered, each 1¢ difference would reduce consumer costs by more than \$300 million. This implies that retail food prices would decline proportionally.

But according to the EPI study—although prices of raw sugar, wholesale refined sugar and HFCS tend to move closely together—changes in these prices do not explain changes in sweetener costs to customers.

More than 75% of U.S. sweetener consumption is in beverages and processed foods rather than in granulated retail products, the report says. "For these foods, changes in wholesale sugar prices have almost no discernible short-term impact on retail food prices." Example: Food prices rose and sugar prices rose in 1979-80, but when sugar prices dropped by 50% in 1981, there was no significant impact on retail food prices. Subsequent rise and falls in sugar prices produced no impact, either.

"Price changes depend on a range of costs and changes in recipes and product formulation," the report continues. "Small decreases in the sugar price-support loan or in raw sugar prices result in relatively small savings in consumer costs in the short run."

The EPI report makes no recommendations concerning price supports but does identify one key factor affecting producer incentives: The current market-stabilization price (21.17¢ per lb.) is lower than the average cost of production (21.53¢ per lb. for raw cane sugar, 25.52¢ per lb. for refined beet sugar). "Continuation of such a policy should lead to continued declines in domestic production," the report concludes.

Speakers from agriculture, industry, labor and government at the International Sweetener Symposium mainly called for continuation of

the current sugar program. Michael D. Warner, legislative committee chairman for the American Sugar Beet Growers Assn., expressed one reservation: The current loan level has "fallen short" of maintaining the beet industry, where two plants were shut-down in 1982."

No-cal/low-cal sweeteners

No-calorie and low-calorie sweeteners—aspartame, saccharin and cyclamate and others—will start grabbing a bigger share of an expanding market even before projected maturity of the HFCS market in 1986, said Robert D. Barry of USDA's Agricultural Research Service. Major reason: Continued fast expansion of diet food products, especially diet soft drinks.

In 1985, the gain by HFCS is estimated as less than the loss in sugar consumption, with overall caloric-sweetener consumption declining by 0.2 percent and no-cal/low-cal sweeteners filling the gap.

Aspartame has shown "astonishing growth" since the 1981 (tabletop) and 1983 (soft-drink) approvals by FDA, he continued. U.S. aspartame consumption for 1983 is estimated at 2.5 lbs. per capita (sugar-sweetness equivalent) and—despite a relatively high price—seems constrained mainly by production capacity. Consumption of diet soft drinks soared nearly 25 percent in 1983, reaching an estimated 18 percent of total soft-drink sales, he added.

Although total sweetener use (caloric and non-caloric) is forecast to rise from 136.5 lbs. per capita in 1983 to 147 lbs. per capita in 1990, "the dimensions of inter-sweetener competition will depend on regulatory decisions, relative cost, market prices, and technical factors governing (food applications)," he pointed out.

Chilton's Food Engineering

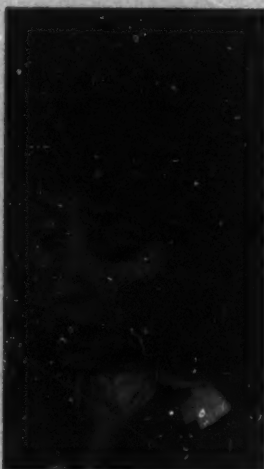
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ALSO:
Exporting Processed Foods
HFCs Quality Standards

Chilton's Food Engineering



ABOUT THE COVER

Compensation: it's one of our most closely guarded secrets. Still, we'd all like to know how we're doing compared to others in the field. Food Engineering's 1984 Salary Survey provides a guide to how you rank in compensation.

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Should corporations compensate people, towns for loss of income? Is legislation the answer to this volatile issue? Read about this increasingly controversial problem.

21 Health-related food advertising

The FTC supports health-related advertising but the FDA is not as certain about its value. It's an issue we haven't heard the last of.

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IBP chief says the company is "not-for-sale", but concedes a premium price would be hard to refuse.

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According to the 1,600 respondents to our salary survey, the average salary for all types of food industry "managers" is \$33,200. That's an increase of \$4,200 from 1980; not allowing for inflation. With inflation, however, it's 8.3 per cent less! Compare your salary to these industry averages.

70 Tomorrow The World!

The U.S. Market is becoming mature. Future success in the processed food industry may well depend on exports. Opportunities exist in many foreign countries if trade barriers can be overcome. Discover how some processors, large and small, are taking advantage of the international market.

78 New Quality Standards for HFCS

Higher quality standards lead to higher HFCS levels in colas. Better quality also triggered a breakthrough.

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DRIED FRUITS: Bonner Brand Fruit Basket marks the first attempt by this private labeling firm to market its own brand in this category.

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SEEKING NEW MARKETS: Exports of processed foods could relieve some of the market pressure creating the acquisitions binge in the industry.

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It was not a breakthrough type of show for packaging materials and containers, but many ideas represent incremental growth.

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Aluminum foil and foil/film combinations are ideal for lidding the new multilayer plastic containers.

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BULK TRUCKING: Bulk trucking has gained an increasingly important role in the food and beverage industries today.

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Special Emphasis

PROCESSING EQUIPMENT

We give special focus in our new product section to processing equipment. A water jet cutting system is just one of many new items featured.

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1984 SALARY SURVEY

Are you better off than you were four years ago? Not if you work in the food industry! Salaries average only 14.5% higher than in 1980. With inflation, that's 8.3% less!



We're not saying that each individual in the food industry is making 3,000 1980 dollars less than he was four years ago. But the results of *Food Engineering's* exclusive 1984 Salary Survey indicate that the industry average is down by that amount. According to over 1,600 respondents to our survey, the average (median) salary for all types of food industry "managers" is \$33,200. That's an increase of only \$4,200 from 1980, not allowing for inflation. And, that's down \$2,200 from last year's survey. With an inflation rate of 3.8% for the year ended August, 1984, last year's average of \$35,400 should have increased to \$36,750, just to break even.

Vice Presidents of Manufacturing top our list this year, with an average salary of \$57,300. That's 2.6% less than reported by the same group last year. Salaries of Vice Presidents of Marketing/Sales are down 8.8% to \$56,000. Vice Presidents of Research & Development lost a whopping 20.7%, according to the survey. Salaries for this group fell an average of \$13,800 to \$53,000 this year.

Only six categories reported average salary increases this year. Engineering Managers topped the list, with an average increase of 7.2%, or \$3,100. Product Managers followed, with an average increase of 6.7%, or \$2,300. The only other significant increase went to Marketing Managers. This category jumped 5.6%, or \$2,400 to \$45,400. Other categories reporting increases were Chemists, up by 1.4%; Sales Managers, up by 1.3%; and Packaging Managers, up by 0.8%.

Salaries in all other categories declined. The largest drops, after Vice Presidents of R&D

were suffered by Production Supervisors and Food Technologists, whose average salaries declined 9.9%. Sanitation/Maintenance Managers dropped 9.2% and Quality Control Managers, 9.0%. Even a 5% increase looks good next to these numbers.

An attempt to generalize on the salaries of Presidents, C.E.O.'s and C.O.O.'s would be non-productive. Salaries of these executives range from under \$10,000 for some smaller companies, up to over a million dollars for food giants such as Coca-Cola and Nabisco Brands. Most of the Presidents responding to our survey are from companies with fewer than 100 employees. These executives averaged only \$46,100 in salary.

Why the drop?

The first thing we studied in determining the reason for the drop in salaries was the survey itself. However, we found that the respondents as a group were very similar to last year's group. The percentage of responses from each different job category were very close to last year. Responses from different sections of the country were also very similar.

There are almost exactly the same percentage of male and female responses as last year. The percentages of respondents working for small and large companies is also very similar to last year. We then looked at the experience factor, and found that this year's respondents had slightly more experience than last year. 58.8% of this year's respondents have 15 or more years experience. Last year the figure was 56.8%. In education, 73.0% of this year's respondents

(Continued on next page)

Bill Drennan
Senior Editor

COMPENSATION/HOW DO YOU RANK?

The salaries of all Vice Presidents as a group fell by 9.2% this year to \$56,100.



hold at least a Bachelor's degree, compared to 69.1% last year.

So what's the answer? Sales and profits are generally up throughout the industry. Capital is widely available. So much so, that major companies are acquiring and merging with each other at a record pace. 645 transactions occurred in 1983, and the 1984 pace has been exceeding that. Cash is also available for stock repurchase plans. Several major companies, including General Mills, Beatrice, Ralston Purina and Nabisco are engaging in stock repurchase. Expenditures for advertising have been phenomenal, as companies battle each other for a larger share of a static marketplace.

Consolidation a factor?

Perhaps the answer lies in the consolidation of the industry. It may be becoming a buyer's market as the total number of jobs available shrinks. This is especially true for top executive positions. The first positions to be trimmed after an acquisition are high-paying executive jobs that can be handled centrally by the acquiring company. Sales and marketing staffs are also often consolidated.

Another culprit could be the lack of inflation. For the year August, 1983 to August, 1984, the inflation rate was 3.8%, according to Department of Labor statistics. While a low inflation rate has contributed to an expanding economy and stable prices, it also means that cost of living increases have been negligible or non-

existent. Companies can also afford to offer less for new or replacement positions, knowing that the economy will back them up.

Right down the line, the best salaries are paid by companies with 500 or more employees (see accompanying chart). About half of our respondents work for large companies (500 or more employees). The median salary for these respondents is \$37,000, \$3,800 above the overall average, and \$6,400 higher than the median for companies employing fewer than 500 employees. The only real stability is for Project Engineers whose compensation is nearly equal for all categories. On the other hand, Engineering Managers are paid nearly twice as much at large companies, than at companies with fewer than 100 employees. The top paying jobs generally pay much more at larger companies.

Salaries vs. education

Almost three quarters of this year's respondents have at least a Bachelor's degree. This could reflect the requirements of the technical positions multiplying throughout the industry. Engineering Manager, Project Engineer, Technical Director, Quality Control Manager, Food Technologist and Chemist are all positions requiring technical expertise generally found in a college education. People holding these positions accounted for 35.8% of our respondents.

The median salary for this "technical" group is \$32,800, just under the total median salary of \$33,200. This group is vocal, and feels it is

Salary Range By Job Function

The number indicates the percentage of respondents in each salary range by job function. For example, 17.9% of the responding Engineering Managers reported a salary within the range of \$55,000-\$59,999.

	Vice President R&D	Vice President Marketing/Sales	Vice President Manufacturing	Technical Director	Marketing Manager	Engineering Manager	Plant Manager	Sales Manager
Under \$10,000	—	2.0	—	—	—	—	1.0	1.2
\$10,000-\$14,999	—	—	—	0.9	—	—	2.0	—
\$15,000-\$19,999	—	2.0	2.1	0.9	7.3	1.3	2.0	4.6
\$20,000-\$24,999	—	4.0	2.1	0.9	2.4	6.0	11.2	10.8
\$25,000-\$29,999	5.6	4.0	4.2	9.4	12.2	3.0	15.3	13.3
\$30,000-\$34,999	—	12.0	3.3	17.0	7.3	2.0	10.2	12.0
\$35,000-\$39,999	11.1	10	4.2	12.3	17.1	13.4	12.2	12.0
\$40,000-\$44,999	11.1	4.0	6.3	11.3	2.4	11.9	10.2	10.8
\$45,000-\$49,999	16.7	10.0	12.5	17.9	22.0	23.9	16.3	12.0
\$50,000-\$54,999	11.1	6.0	6.3	9.4	9.6	10.4	4.1	6.0
\$55,000-\$59,999	27.8	12.0	12.5	11.3	14.6	17.9	8.2	12.0
\$60,000-\$64,999	3.6	14.0	14.6	1.9	2.4	—	3.1	3.6
\$65,000-\$69,999	2.6	2.0	12.5	2.8	2.4	3.0	1.0	1.2
\$70,000-\$74,999	—	2.0	4.2	0.9	—	—	1.0	—
Over \$100,000	2.6	16.0	12.5	0.9	—	—	—	—

underpaid. One Food Technologist earning between \$30,000 and \$35,000 states, "For the amount of education required and considering the responsibilities of Technologists vis a vis product safety and compliance, I feel they are underpaid." A Technical Director making between \$45,000 and \$50,000 believes that "Chemists in the food industry are not paid equally with Chemists in other industries with similar degrees." A Quality Assurance Supervisor in the meat industry says, "People do not understand the extent of what technical people contribute." An Engineering Manager making between \$40,000 and \$45,000 complains, "Salaries for engineers in the food industry have always lagged behind salaries paid by other industries. I've tried moving elsewhere during the past 2-3 years, but there seems to be little or no demand for middle level engineers in the food industry, while other industries require applicable experience for their particular field."

The experience factor

In general, the more years experience you have, the higher you're paid. But, it's not that much higher (see accompanying chart). 20-24 years of food industry experience is only worth \$15,500 more than 3-5 years of food industry experience. And it's a slow, gradual climb. Promotion is much more important in terms of salary than experience. *What* a person does is worth more than *how long* he or she has been doing it. And yet, experience is a sore point

with many of our respondents.

One Project Engineer with 10 years total experience states, "Whereas a salary of \$35,000 is respectable for 10 years experience, graduates fresh out of school are receiving starting salaries of \$27,000 to \$30,000. Shouldn't 10 years experience be worth more than \$5,000 per year?" A Food Technologist with 30+ years experience contends that, "Younger managers should spend more time in grade so that they fully understand their job function and the quirks of their industry. More practice, less theory." A Quality Control Manager with 30+ years experience asserts, "It is my opinion that insufficient consideration is given to those who bring to their position long and varied experience. These are the people who anticipate problems, minimize consequences, yet they are more often than not taken for granted."

A Purchasing Manager with 30+ years total experience expresses what must be the opinion of many long term employees, "As an individual grows older, both in actual years and employment with a company, there seems to be a tendency to overlook the fact that one is still capable and productive. This is especially true if one is middle management. Assignments and promotions are given to younger people. Yet, given the opportunity to work with these younger people would only benefit all involved."

On the flip side of these complaints, a young Food Technologist earning \$20,000 to \$25,000

(Continued on page 66)

Engineering Managers were one of the few groups to do significantly better. Salaries rose 7.2% to \$46,000.



Packaging Manager	Project Engineer	Product Manager	Transportation/Distribution Manager	Manufacturing Manager	Purchasing Manager	Quality Control Manager	Production Supervisor	Food Technologist	Chemist
1.4	—	—	—	—	0.6	—	—	2.3	—
2.3	—	2.3	3.4	6.7	2.3	6.3	1.9	6.0	—
8.0	2.2	6.7	10.2	13.3	14.4	18.0	20.4	20.5	4.5
8.0	13.0	3.3	11.2	5.7	17.4	16.9	24.1	17.0	27.3
11.4	15.2	3.3	20.3	23.5	8.3	25.4	33.3	30.7	22.7
12.5	27.2	16.7	13.3	16.7	22.0	1.8	5.6	14.8	27.3
17.0	17.4	40.0	10.2	18.3	7.8	7.9	5.6	11.4	4.5
8.1	17.4	13.3	20.2	13.3	9.1	8.3	5.6	5.4	—
10.2	5.4	6.7	20.2	3.3	3.3	2.1	3.7	—	4.5
6.8	1.1	—	4.7	—	3.0	2.1	—	—	—
6.8	—	6.7	1.7	—	3.3	2.1	—	—	9.1
3.4	—	—	1.7	—	0.8	0.5	—	—	—
—	—	—	1.7	—	0.8	—	—	—	—
—	1.1	—	—	—	0.5	—	—	—	—
1.1	—	—	—	—	—	0.5	—	—	—

COMPENSATION/HOW DO YOU RANK?

Education	Average Salary
High School	\$18,000
Some College	\$20,000
College Degree	\$22,000
Master's Degree	\$25,000
Ph.D.	\$28,000
Professional Degree	\$30,000
Executive Degree	\$32,000
Postgraduate	\$35,000
Executive Education	\$38,000
Executive Training	\$40,000
Executive Development	\$42,000
Executive Coaching	\$45,000
Executive Consulting	\$48,000
Executive Advisory	\$50,000
Executive Mentorship	\$52,000
Executive Sponsorship	\$55,000
Executive Partnership	\$58,000
Executive Equity	\$60,000
Executive Royalty	\$62,000
Executive License	\$65,000
Executive Franchise	\$68,000
Executive Partnership	\$70,000
Executive Equity	\$72,000
Executive Royalty	\$75,000
Executive License	\$78,000
Executive Franchise	\$80,000
Executive Partnership	\$82,000
Executive Equity	\$85,000
Executive Royalty	\$88,000
Executive License	\$90,000
Executive Franchise	\$92,000
Executive Partnership	\$95,000
Executive Equity	\$98,000
Executive Royalty	\$100,000

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Executive Partnership	\$78,000
Executive Equity	\$80,000
Executive Royalty	\$82,000
Executive License	\$85,000
Executive Franchise	\$88,000
Executive Partnership	\$90,000
Executive Equity	\$92,000
Executive Royalty	\$95,000
Executive License	\$98,000
Executive Franchise	\$100,000

coming a popular benefit. And yet, company cars are still around for Sales Managers and top executives.

However, one Quality Control Manager voices what must be a common complaint. "It's my contention that bonuses, incentive pay, automobiles, country club memberships and other "perks" should be done away with for top management executives. Why should they have more when they earn enough already? Perhaps better job performances would occur if the "working" forces were treated to some of these benefits, even on a sporadic basis."

A variety of response

An important facet of our annual survey is the "Comments" section. It is through your comments that we get a feel for the industry attitude towards salaries. Hopefully, we can convey this to our readers. A Product Manager from the Middle Atlantic states tells us, "In lower levels of marketing, there's a big problem with salaries because the 'market price' of new people has escalated so much. So new people make the same salary (or more!) than people one level above them because the raise/compensation system can not address these issues."

A West Coast Food Technologist says, "I have observed that salaries for professionals in the food industry are very politically oriented. Merit has little or no place." A Plant Manager from the Southwest believes, "I have worked hard and trained my people well. When I leave this company, production will remain the same. However, my ex-employer will pay 15% more for my replacement. And, with any luck I'll get the same increase when I replace some other manager that's being taken for granted."

A West Coast Project Engineer informs us that, "Salary increases based on performance

(Continued on page 68)

informs, "A Fortune 50 company, such as the one I'm employed with, grossly underpays their entry level managers. In fact, the majority of my hourly employees make more than I do!"

Male vs. female salaries

There is little change in the relative status of female salaries this year. Female respondents averaged \$22,100 this year, \$13,000 less than male respondents. The only category in which females did not earn significantly less than their male counterparts, was Product Manager, where both averaged \$37,000. One female Purchasing Manager writes, "While trying not to sound like a feminist revolutionary, women are still being grossly underpaid. I'm currently seeking new employment because my salary is under \$30,000, while I'm responsible for purchasing \$30,000,000 in raw materials, plus futures trading."

Benefits packages

"Fringe benefits are also an important consideration in addition to salary, i.e. dental plans, life insurance, etc.," says one Technical Director. Many of our respondents listed life insurance, health insurance, retirement plans and bonuses or profit sharing plans as benefits. Full or partial tuition reimbursements are be-

COMPENSATION/HOW DO YOU RANK?



Food Technologists and Q.C. Managers averaged less this year. Combined, their average salaries dropped 9.1% to \$26,000.

Salaries vs. Experience

Years Experience	Total Experience Salary	Food Industry Experience Salary
0-2	\$17,400	\$23,300
3-5	22,300	25,300
6-9	26,700	27,600
10-14	32,100	32,300
15-19	33,900	36,100
20-24	37,700	40,700
25-29	40,800	42,000
30+	40,600	38,900

Respondents were asked to supply both total years of experience and their years of food industry experience. For example, one Transportation/Distribution Manager listed 20 years of total experience, but only 6-9 years of food industry experience.

Geographical Average Location

Location	Average Salary
New England	\$28,300
North Atlantic	26,300
South Atlantic	26,000
Deep South	26,000
North Central	27,600
Plain States	27,100
Rocky Mountains	26,300
Southwest	31,000
West Coast	33,200
Outside Continental U.S.	37,100

appraisal programs generally tend to point up problem projects and play down exceptional projects." Finally, a Chemist from the North Central states writes, "We need strong leadership with good strategy, (not a mediocre manager who achieves everything through other people, but a leader who makes breakthroughs) to win a game. However, managers in this country are more harmful than helpful to technical people."

Average (Median) Salaries By Company Size

	1-99 Employees	100-499 Employees	500 or more Employees
Vice President, Manufacturing	\$47,000	\$54,300	\$75,900
Vice President, Marketing/Sales	39,300	36,300	60,000
Vice President, R&D	49,000	49,300	57,000
Engineering Manager	27,000	39,000	48,300
Marketing Manager	28,000	37,000	47,600
Technical Director	39,000	32,700	48,900
Plant Manager	28,600	41,300	48,300
QA Manager	34,300	37,000	41,600
Production Manager	30,900	36,300	37,300
Research Manager	22,000	29,300	37,300
Product Engineer	23,000	31,300	33,900
Manufacturing/Plant Manager	19,000	27,300	33,000
Production Manager	27,300	23,300	33,300
Production/Performance Manager	28,000	28,300	38,000
Quality Control Manager	22,300	22,300	31,000
Quality Control Manager	22,000	23,400	30,700
Production Supervisor	24,300	23,800	27,300
Food Technologist	19,300	21,600	27,300

Salaries for food technologists and quality control managers were lower this year. Across the board, the highest average salaries are for executives with 500 or more employees.

Playing the game

In any capitalistic industry, salaries are, always have been, and always will be an expense. With all companies, the object of the game is to make a profit and keep expenses to a minimum. With larger companies, priorities are given to: *capital spending*, to remain competitive by keeping plants and equipment up to date and to maintain asset value; to *dividends*, to keep stockholders (technically the owners) happy; and to *marketing*, to maintain or improve sales volumes. With smaller companies, just staying afloat can be a priority. In union shops, union wages are a "given".

So in this country, the line is generally drawn at R&D, and at compensation for middle and lower management. The object of the game is not to improve the relative status of a company's employees. The object is to improve the position of the company itself. If an individual is perceived as important in contributing towards that end, and if that individual demands higher compensation, then that individual will get it. Otherwise, salary increases will be held to the bare minimum. Individuals are as often promoted or dismissed because their compensation is perceived as being too high for their responsibilities, as for relative merit. Judging from the results of this year's survey, this year, the corporate entity is winning.

MARKETS/INTERNATIONAL SURVEY

TOMORROW THE WORLD!

The U.S. market is becoming mature. Future success in the processed food industry may well depend on exports. Opportunities exist in many foreign countries if trade barriers can be overcome.

Big financial deals, involving food companies, dominate today's business news. Maybe no other industry in America is undergoing such profound change. One food giant gobbles up another almost on a daily basis. At the same time the food industry continues to pummel the marketplace with over 3,000 new products a year, although only a fraction of these products will survive to become an established brand.

Both phenomena, the acquisitions binge and the obsession with new products, can be traced back to one driving force—the American marketplace is only so big and it doesn't expand much from one year to the next. Overall packaged food volume grows at a mere 1 to 2 percent per year. With a non-expanding market that means the leading food corporations in America must battle each other for every precious market share point.

What's needed, say some people in the industry, is a larger market. What's especially heartening, they add, is that it's already here, just awaiting an assertive industry. The market they

are referring to is the 4 billion or so other people who live on this planet with us—the international market.

Food Engineering recently conducted a telephone survey of companies exporting processed foods. What that survey revealed (see the tabulated results on page 75 of this article) is that a growing number of companies see the international market as one of their best hopes for achieving growth.

We know that the United States has become the world's largest exporter of commodities. What is not as well known is that value-added food products now account for 35 percent of U.S. food exports. On an overall basis, growth in this category has averaged 7 per cent per year since 1977. Today these products account for over \$11 billion in export food sales.

It is unlikely that the world demand for our increasing food production will be met by exporting only commodities such as wheat, corn, or soybeans. Increasingly the nation will come to rely upon regional food processors to convert

(Continued on page 74)

MARKETS/INTERNATIONAL SURVEY

"To be successful in the future, food processors must look beyond the shelves of local stores and make the world their marketplace."

— James L. Dutt, chairman & CEO, Beatrice

much of our production into value-added products, which meet the growing demands for specialized foods, particularly for our more affluent trading partners such as European nations and a growing number of countries in the Far East and Latin America.

In fact, developments in American food processing technology has played a major role in the growth of American exports overseas during the last 10 years. For example, during this last decade frozen vegetable exports increased 400 per cent from 21 million to 82 million pounds. Exports of canned vegetables more than doubled from 212 million to 332 million pounds. Frozen non-citrus products have increased 250 per cent from 22 million to 55 million pounds. Frozen citrus products have shot from 151 million to 239 million pounds in this ten year span. The dairy industry has also carved a significant niche by further processing perishable milk into a variety of dairy products whose demand has increased nearly 400 per cent from 1.3 billion pounds per year to over 4.5 billion pounds annually. Similarly, processed fish products have more than doubled from 215 million pounds to well over 500 million; beef from 144 to 305 million pounds annually; ready-to-cook chicken from 203 million to 675 million—a 300 percent increase.

NASDA Exposition

Still, for the most part, the number of food companies taking advantage of this opportunity for new markets is relatively small. It probably won't remain small. Both the federal government and individual state departments of agriculture are beginning to make it easier to get into the export market. For example, the National Association of State Departments of Agriculture (NASDA) in 1983 sponsored the National Food and Agriculture Exposition featuring exhibits by U.S. processors. The show was attended by foreign buyers from 76 countries. The next show is scheduled for April 22-24, 1985 in Kansas City and should draw an even higher attendance of foreign buyers and up to 600 exhibitors from the food industry.

Many of the exhibitors at the NASDA exhibition will be small companies but recognition of the international market is also on the minds of the national's largest food companies as well. In the August, 1984 issue of *Food Engineering* James L. Dutt, chairman and CEO of Beatrice wrote: "To be successful in the future, food processors must look beyond the shelves of their local stores and make the world their marketplace. This trend will accelerate in coming years because the opportunities for expansion and real growth in the international arena outweigh the potential in domestic markets.

"The world marketplace," continued Dutt,

"has many countries with expanding populations, all clamoring for more consumer goods. In particular, the Pacific Basin has exciting growth potential, and many areas of Latin America are ripe for growth. Gaining market share is often easier in these areas than in highly saturated domestic markets, where enormous efforts and expenditures are required for minimal shifts in consumer allegiance."

Dutt, in that last statement, zeroes-in on what many think will become a compelling reason for large food corporations to go international. To establish a brand in the marketplace a company must be prepared to spend anywhere from \$15 million to \$50 million. And even that investment is no guarantee that a competitor will not come along with a more popular product in that category, or spend a little more to gain control of the market. The American food market has become a battlefield laced with plenty of mine fields.

Secrets to export success

Success in exporting is not simply a matter of deciding you want to be in the export business one day and gaining instant success the next day. Yes, there's a market out there but finding it and profiting from it requires commitment and hard work. That's the gist of our telephone conversations with food processors who do export. They emphasize that entering the international market can be a little like a roller-coaster ride. A particularly difficult hurdle today, for example, is the strength of the dollar. Over the past few years, the value of the dollar has increased dramatically vs. most foreign currencies. Since the beginning of 1984, the dollar has risen 90.8% against the British pound, 54.3% against the German mark, and 106.0% against the French franc. This makes it easy to buy foreign goods, but extremely difficult to sell domestic goods abroad.

The processors interviewed by *Food Engineering* were all exporting. Their export sales varied from 5 percent to 50 percent of total sales. About 30-40 percent were a little dismayed about their export sales citing a strong dollar as one of the major handicaps. But there were certain common denominators that surfaced among the more successful companies:

1. **Make a commitment.** A decision, understood and supported by all levels of management, that the company is, in fact, now in the international market is a critical first step. This means that even during currency swings management will continue to support its international sales program. Top management's response and attitude during low periods in export development will set the tone when the climate improves.

(Continued on page 76)

I. A sampling of American food processors who currently process and export a variety of food products throughout the world. The sample was designed to be random in the selection of the particular company but fairly representative of the range of processed food products currently being exported from the United States.

The percentage of survey participants by major food category is:



Fruits	19%
Vegetables	15%
Meat	15%
Poultry	15%
Grain Products	9%
Seafood	6%
All Other	21%
	100%

II. The survey participants currently export to most areas of the world other than Eastern Europe and the USSR.

The percentage of respondents who currently trade with each geographic area is:

Latin America	21%
Asia	17%
Western Europe	16%
Canada	14%
Oceania	11%
Africa	9%
Middle East	7%
All Other	5%
	100%



III. (a) The sales trends of the survey companies as a whole have been generally upward over the past five years.

Sales Trend
last 5 years

Decrease	38%
Steady	21%
Increase	41%



III. (b) However, the super strong U.S. dollar made trading this year much more difficult and overall sales have fallen.

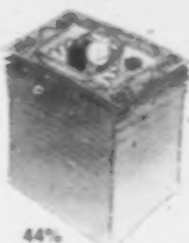
Sales Trend
1984 versus 1985

Decrease	45%
Steady	16%
Increase	39%



Sales Trend
Next 5 years

Decrease	29%
Steady	4%
Increase	67%



44%

Strong
Dollar



34%

Trade
Barriers



22%

Regional Tastes
Preferences

Three Major Obstacles to Increased Food Exports

IV. Most respondents are in agreement that currency-related problems, such as the strength of the dollar, are their greatest obstacle to increased sales.

Trade barriers, duties, and quotas are also a significant problem.

Their third greatest obstacle to overcome is in the area of product development and packaging to suit local taste.

V. As they assess their future sales opportunities, the respondents see growth opportunities in many product categories. The five most promising categories cited were:

- #1 Poultry products
- 2 Meat products
- 3 Cereal and bakery products
- 4 Fruits
- 5 Fats and vegetable oil products



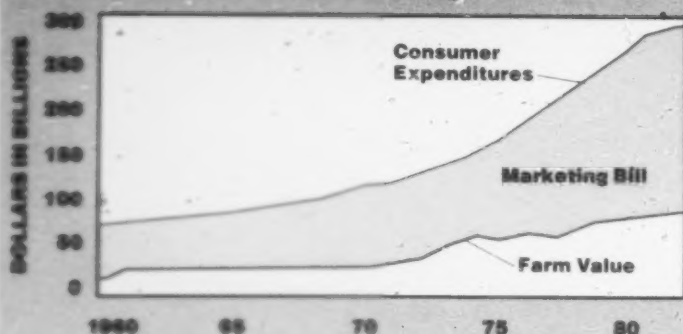
VI. The regions of greatest growth in the next five years appear to be:

Asia	23%
Latin America	19%
Canada	19%
Oceania	15%
Western Europe	14%
Africa	10%

III. (c) The current slowdown in exports has not discouraged the average food exporter. In fact, most are optimistic that the next five years will result in better sales than ever.

MARKETS/INTERNATIONAL SURVEY

MARKETING BILL, FARM VALUE, AND CONSUMER EXPENDITURES FOR DOMESTIC FARM FOODS



Exporting processed foods rather than raw materials takes advantage of the huge difference between farm value and consumer expenditures.

2. Look international. Sales literature, specification sheets, and foreign advertising should be translated even if the people you deal with speak English. For most Americans traveling abroad it's easy to come to the conclusion that everyone speaks English. Fact is, while the people you deal with may speak English, their business activity in the office is conducted in their own language. Clerks, secretaries, operations people, research and development personnel need information in their language to be most effective. If you have foreign sales offices or distributors their locations should also be listed on technical material or your letterhead.

3. Act international. The more you know about the countries and cultures to which you are selling, the greater your chances of success, say those who are successful. Try to learn another language. You don't necessarily have to be fluent in a second language but, if nothing else, it will help you appreciate the difficulty your customers have in conducting business with you in a second language. When traveling abroad, the key word is *tolerance*. You don't have to like the food, hotels, or driving customs in a country, but you may be better off by accepting them and not complaining.

4. Develop products for the market. The more you know about potential markets, the greater your chances for success. This may require you to consider alternative means of processing, packaging, and ingredients technologies. In Europe, become aware of national or EEC regulations governing flavors, colors, and other ingredients. Analyze distribution and retail environments. Chances are you may want to package products differently for a wider range of temperature and handling extremes.

Products that sell well in the United States will not necessarily be popular in another culture. Encourage buyers in foreign markets to give you ideas of how you can develop successful products for specific markets.

5. Establish affiliates. Another route to success is to establish an affiliation with a processor in another country. That company may have products or raw materials you would like to introduce into the U.S. On the other hand, the foreign processor certainly knows his market better than you do and has an established national sales and distribution network that can help your products gain acceptance.

Beatrice, for example, established a 50-50 joint venture with Guangmei Foods Ltd. in China. That relationship is now producing extruded corn snacks for export and the Chinese market. Start-up will begin shortly for soft drinks for consumption within China and for export. Eventually, other products, including canned vegetables and fruit juice will be added.

A major benefit of this type of expansion into international markets is the synergy that can be created. The canned vegetables from Guangmei will be used by Beatrice's La Choy operations in the U.S. Payments for the vegetables, in turn, will provide hard currency for building additional manufacturing capacity needed to produce items for the Chinese market.

From TVs to Sushi

While we are accustomed to considering Japan as an exporting giant, increasingly dominant in former American strongholds, Japan today is also consumer of foods and beverages from nearly every corner of the globe. And a lot of what Japan wants is American made food. Even the nutritional concerns are similar. There's growing interest there today in weight control and cutting down salt intake.

On the other hand, a current boom in Japanese food and beverages means that, in the future, Japanese food makers will be competing with American processors. Sushi is just the beginning of this new competitive wave. Kibun Company is marketing surimi to the U.S., Kikkoman has long been a force in the U.S. food market, and even barbecue sauce, made by Ebara Foods, is being sold to the U.S. Beer companies are also enthusiastic about sales in the United States. The exports of four brewers, says *The Japan Economic Journal*, Kirin, Sapporo, Asahi and Suntory rose more than 50 per cent on average last year. Sapporo Breweries Ltd., which is catching up with Kirin Brewery in the U.S., will shortly set up a subsidiary in the U.S. to boost sales.

A matter of survival

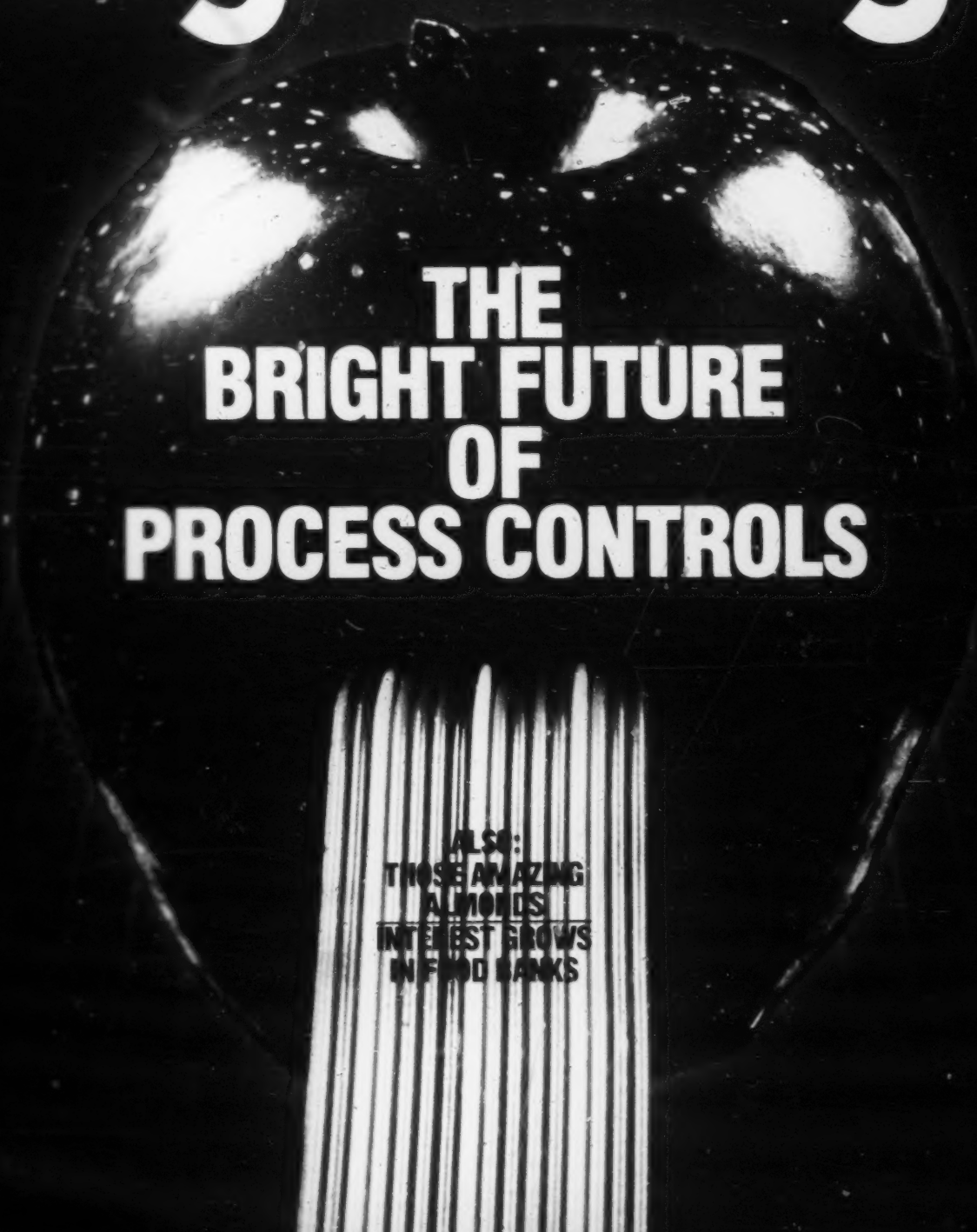
With Japan increasingly active in food and beverage exports and European firms also gaining momentum in this market, American food companies may find in the next ten to fifteen years that going international will become a matter of survival.

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Chilton's **Food Engineering**

FEBRUARY 1985

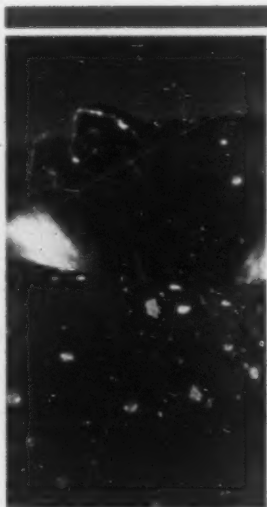
\$3.00



THE BRIGHT FUTURE OF PROCESS CONTROLS

**ALSO:
THOSE AMAZING
ALMONDS
INTEREST GROWS
IN FOOD BANKS**

Chilton's Food Engineering



ABOUT THE COVER

Food companies have taken a shine to process controls, but they want simplicity, not "bells and whistles." Find out what else lights up food companies in a collection of stories that show what process control really offer. Thanks to AMP, Inc., Harrisburg, Pa. for contribution to cover photo.

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POSTMASTER: Send form 3579 to Food Engineering, Post Office Box Number 1452, Riverton, N.J. 08077.

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17 The cholesterol labeling issue

The fervor between consumer groups, physicians and the industry over fat and cholesterol in foods is coming to a head. Attention is now turning to FDA's response.

23 Japanese efficiency techniques

A New Jersey food industry consultant says U.S. food processors could greatly increase their efficiency by applying Japanese management techniques to their own corporate system.

30 Campbell's growth strategy

Campbell Soup Co.'s long-term growth will come from new products and new technology, Campbell vice president/finance Richard J. Censits told a group of Chicago investment analysts.

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79 What Process Controls Offer

Do process controls deliver all they promise? Will the same computer that saved a bakery \$1,000,000 work for you? Six food processors relate their experiences.

88 Those Amazing Almonds

This cooperative sparkles with both production and marketing innovations. California Almond Growers' Exchange is showing America just how versatile the almond can really be.

92 The Growing Food Bank Network

Second Harvest food banks are experiencing tremendous growth, thanks to an increasing emphasis on quality control.

96 Is Vitamin Fortifying Necessary?

Vitamin fortification promises to become a major player in 1985 health and nutrition issues. One question: When do we have enough?

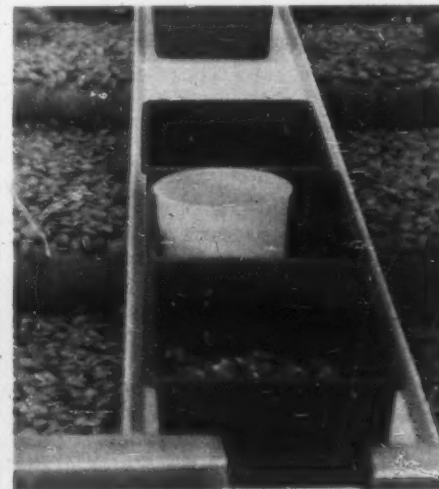
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FROZEN CROISSANTS: Vie de France is entering the frozen croissant market and supporting the introduction with a \$2 million advertising campaign. **PAGE 37**



ALMONDS: 2 million pounds of almonds per day, the bulk of California's almond crop, will be processed by California Almond Growers Exchange. **PAGE 88**

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The acronym above stands for Controlled Atmosphere Packaging. But what can it do for you?

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67 High Barrier

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71 Display Case

By simply pulling a tear tape, the entire cover of the case is removed, leaving a tray with side walls to display the product.

74 Be Informed!

In early December of last year, speakers from all over the world presented papers on the very latest packaging innovations at this Atlanta conference.

76 Literature



C.A.P.: With little fanfare, a number of well-known American firms are actively developing controlled atmosphere packaging for certain products.

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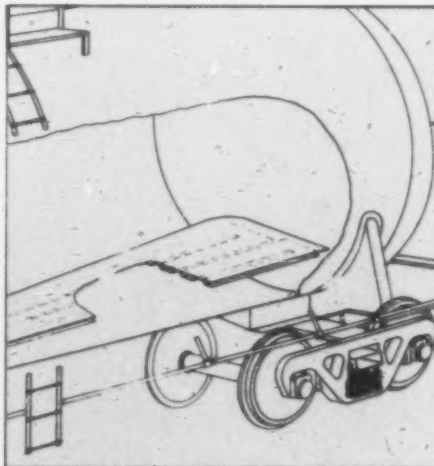
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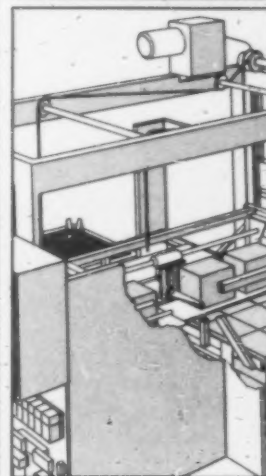
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- 139 Tray packer/shrink wrapper cuts costs



RAILCAR RETROFITS: An interior heating plate uniformly heats and agitates such commodities as corn sweeteners for faster unloading.

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Special Emphasis

HANDLING & DISTRIBUTION

Special focus is given to Handling & Distribution equipment in this month's new product section.

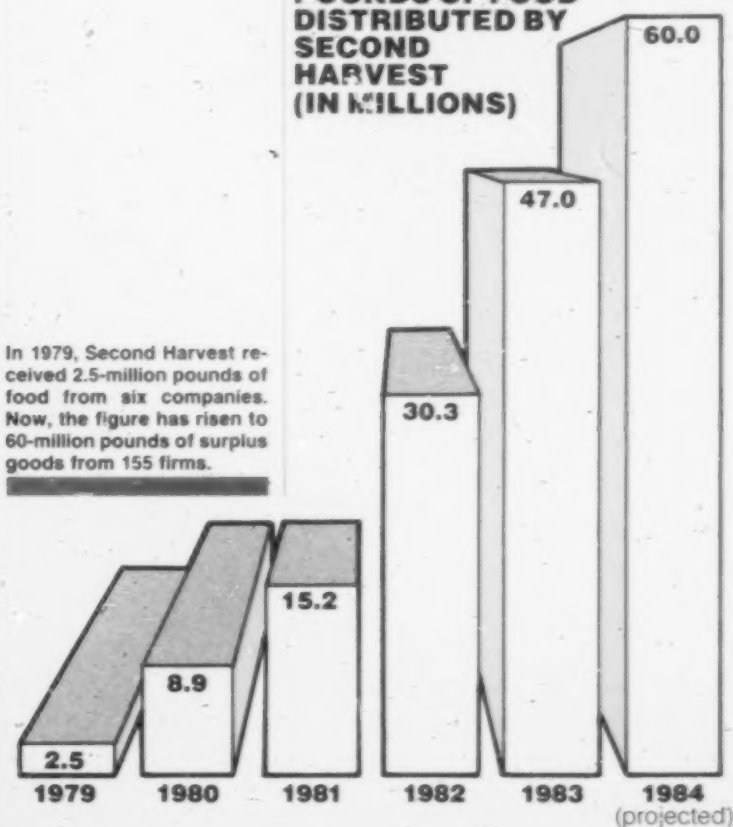
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THE GROWING FOOD BANK NETWORK

Second Harvest food banks are experiencing tremendous growth, thanks to an increasing emphasis on quality control.

Through sound food handling practices and increased quality control efforts, Second Harvest food banks—distributors of surplus food to charities—have mounted the ladder of success. In 1984, the non-profit corporate network solicited and distributed 60-million tons

POUNDS OF FOOD DISTRIBUTED BY SECOND HARVEST (IN MILLIONS)



of surplus food to the hungry.

But they couldn't have done it without the support of the food industry. Food manufacturers are not only adapting "good neighbor" policies by donating 'unsaleable' food products to nationwide Second Harvest Food Banks, but they have become a lifeline to America's needy.

Second Harvest's member food companies have increased food donations considerably since conception of the food banks in 1979, and they have offered funds and volunteer manpower as well. As it stands now, 45 percent of all Second Harvest funding comes from industry. It's the member food companies that make up much of Second Harvest's local boards of directors, too. And it is employees from food firms that have volunteered to carry through annual quality control checks on the food banks, under a program just initiated by General Mills.

The quality control program, under the auspices of the Grocery Manufacturers of America, involves a regular warehouse inspection of each food bank by a volunteer quality control employee from a food firm. Upon each inspection, the volunteer gives advice to food bank operators on food handling procedures and answers technical questions. "What we're doing is building relationships with our donors," says Director of Marketing for Second Harvest William G. Ewing.

Food bank criteria

The Second Harvest network has also established the following criteria which must be met in order to be a member of the food bank chain.

- The bank must occupy an operating warehouse with at least 10,000 square feet. A loading dock is essential.
- Full-time warehouse management is emphasized. This helps to assure correct handling and inventory of food products. Training bulletins are also given to management that help educate them in the areas of safety, pest control, food solicitation, planning, and food bank/charitable agency relations.
- Each bank must have a tracking system, keep accounting records, and must be audited once a year. Record-keeping systems are automated, enabling Second Harvest to have up-to-date product information on hand. These reporting systems also help to maintain tight controls over where and when donations are distributed, says Ewing, preventing any possible leakage into secondary markets.
- All banks must maintain local health codes.
- On-site, walk-in freezer/refrigerator storage is a must, adds Ewing. And each bank must have adequate off-site freezer/refrigerator storage space for overflow donations.
- Product liability insurance and tax-exempt

status is another must.

- Each food bank must have been collecting and distributing food for six months before applying for membership in Second Harvest.

"We have been tightening and strengthening our certification requirements," adds Ewing. "If a food bank doesn't meet our set of requirements, it cannot become a member of Second Harvest."

Another major improvement the food banks have made recently, according to Ewing, is the "complete donation program." Second Harvest will work with food firms to develop donation programs specific to inventory requirements. Each bank will follow instructions from the donating company. A donor may, for instance, set time restrictions on the distribution of their product due to shelf life of the food. Special requirements will be met, says Ewing.

As of now, there are 117 Second Harvest food banks nationwide—75 are already up and running, and the rest are in the planning stage. "This network provides a valuable link between cities," says Second Harvest, "permitting food to be transferred from one food bank to another. As a result, food can be distributed where needed, avoiding long-term inventory and overcrowding at any site."

Advantages to you

Donors can take advantage of the Tax Reform Act, passed in 1976, upon making donations. Qualified corporations can deduct certain costs on inventory items donated to organizations under this law, but Second Harvest recommends that donations be reviewed by tax, legal and accounting departments.

The "Good Sam Act," now in effect in 49 states, states that food companies cannot be held responsible for food after it has been donated, as long as the company has made every possible determination to prove that the food is edible and fit for human consumption.

The biggest—and most rewarding—advantage to food firms joining Second Harvest, however, is an 'intangible' one, according to Second Harvest. "It is an excellent way to be a good corporate citizen," says Linda Takayama of the Grocery Manufacturers of America.

"Membership demonstrates that the donor realizes and accepts its responsibility to community welfare. Participating in the Second Harvest Network fosters better corporate/employee relations...and these benefits extend to the company's national audiences and the local communities in which the employees live," says Second Harvest.

Second Harvest's reputation is backed by food donors and financial contributors, as well. "Working with Second Harvest is good business," comments Bruce Atwater, Chairman and CEO of General Mills, Inc.

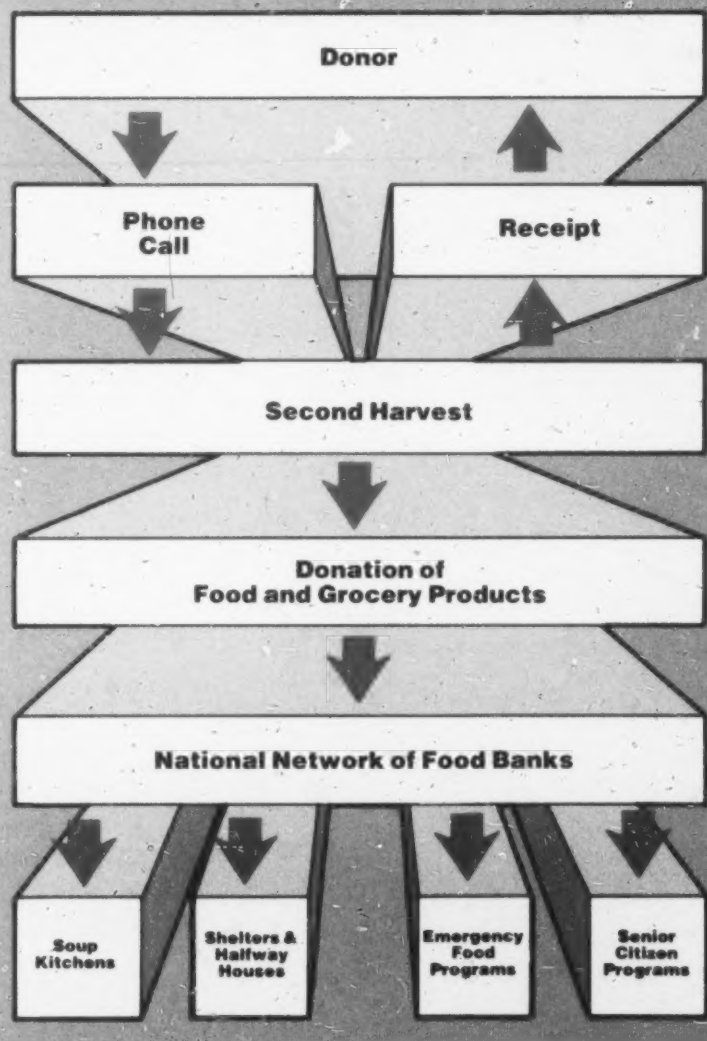
"When our food is distributed by Second Harvest, we are assured that it receives quality care consistent with our own standards and practices. Their firm commitment to food warehousing procedures is respected in the food industry," emphasizes John Nelson, vice president of quality assurance, Kraft, Inc.

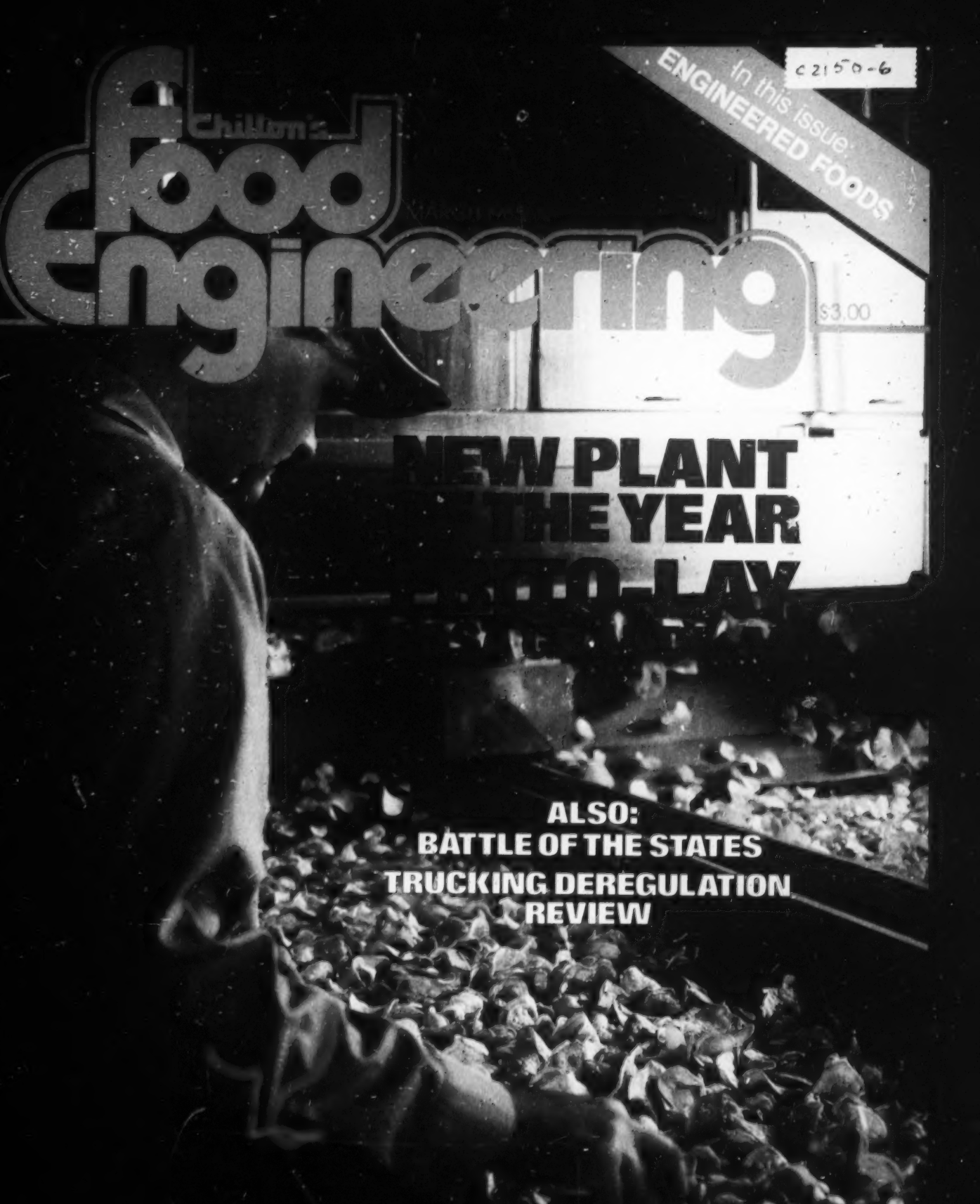
"Few organizations have the ability of Second Harvest to blend care and concern for the needy with an expertise for running cost-effective programs," adds James L. Dutt, Chairman of the board and CEO, Beatrice.

Though the picture is bright, it will be a long time before supply of donated food exceeds demand. Second Harvest needs your help. For further information, contact William G. Ewing, Director of Marketing, Second Harvest National Food Bank Network, 5213 Fairlawn Ave., Baltimore, Md. 21215 (301) 578-1414.

Donors need only make one call to Second Harvest to begin the redistribution process (shown). Or, if preferred, donors may deal directly with local food banks.

SECOND HARVEST SYSTEM





Chilton's Food Engineering

In this issue:
ENGINEERED FOODS

C2150-6

\$3.00

NEW PLANT OF THE YEAR PHOTO-LAY

**ALSO:
BATTLE OF THE STATES
TRUCKING DEREGULATION
REVIEW**

Chilton's Food Engineering



ABOUT THE COVER

Each year Food Engineering selects the new plant we feel offers the most in plant design and engineering innovation. This year, the honor goes to Frito-Lay's Casa Grande, Arizona production facility.

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News

19 Food ads targeted

The Center for Science in the Public Interest (CSPI)—among others—is challenging a rash of food advertisements . . . and winning.

23 Aid for ailing canned foods?

The Canned Food Information Council invested \$1 million into television advertising time during Super Bowl XIX. But market figures and a new canned food forecast show little hope that canned food consumption will even stay on an even keel.

27 Dairymen seeks new options

Excitement over the sales potential of UHT milk has dwindled at the once-enthusiastic offices of Dairymen, Savannah, Ga. Dairymen is now up for sale.

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DOUGH DEVELOPER: By eliminating the time-intensive process of dough fermentation, this rapid dough developer simplifies the baking process. **PAGE 45**

Features

83 Plant of the Year

Frito-Lay's new \$30 million plant in Casa Grande, Arizona has been chosen by Food Engineering for "New Plant of the Year" distinction. In every aspect of plant design and engineering it's an innovator. The new facility will turn out 25 to 27 million lbs. of potato chips, corn chips and tortilla chips in 1985.

97 Targeting New Plant Locations

The battle of the states rages on as food manufacturers continue to seek lower total production costs and a more-friendly labor situation. But now the Frost Belt is fighting back.

104 Is Deregulation Working?

Deregulation has apparently been good for private carriers and bad for unions. But is it good for the food industry? Congress is now reviewing the legislation.



PLANT OF THE YEAR: 25-27 million pounds of potato chips, corn chips and tortilla chips will be turned out in 1985 by Frito-Lay's new Casa Grande plant. **PAGE 83**

Engineered Foods

60 Pinto Beans

As powder, flour, pieces or whole beans, they can be used to make products as modern as brownies and a high-protein cake.

63 Milk Replacer

This natural product extends shelf life of bread and other baked goods without the use of other preservatives.

66 Microwave shrimp

Sogginess will not be a characteristic of this product, with a coating system that resists oil and moisture absorption.

68 Tropical Flavors?

Fruits such as papaya, guava and mangos not only have a unique and delicious taste, but are prized for their nutritional value.

70 Kids' Choice

A new white bread formulation could completely change the public's perception of white bread and its nutritional value.

74 Rice Flour

Chemically produced from broken kernels, this rice flour has more than three-times the protein of regular rice flour, yet costs half as much.

76 Nutritious Snacks

Six-item line of snacks made from whole-grain corn and soybeans contain vitamins and minerals for a "nutritionally balanced" food.



EXOTIC FLAVORS: Considering America's growing love affair with fruit, look for more tropical flavors to emerge in new product formulations in 1985.

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144 Bakery lowers cookie line downtime

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156 'World's largest' ethanol plant

164 Beverage pump resists air locking



IMPROVED SAFETY RECORDS:

Improved safety, through a customized safety program, can lead to greater profitability and higher employee morale.

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Special Emphasis

SANITATION & MAINTENANCE

Special focus is given to Sanitation & Maintenance equipment in this month's new product section.

Pages 111 to 122

NEWS/EVENTS

Will advertising remedy the ailing canned foods market?

The Canned Food Information Council proved the seriousness of its efforts to revitalize the canned foods market when it invested \$1 million into television advertising time during Super Bowl XIX this January. But market figures and a new canned food forecast from the Department of Commerce show little hope that canned food consumption will even stay on an even keel, much less accelerate.

Food can production has been declin-

ing at an average rate of about 2 percent per year over the last five years, says the U.S. Department of Commerce *Industrial Outlook '84*, and the department predicts that the canned food market will decline about .5 to 1 percent over the next five years.

Not only will the task of stimulating the canned foods segment be a tough one, says one market analyst, but it will be impossible. "The market is maturing," he says. "And the trend is irreversible."

"The canned foods market has already experienced its biggest losses," he adds, "But the demand for canned foods will

continue to drop somewhat over the next five years. Then consumption will begin to level off when we find out how much the market can hold."

The reason for the decline? More and more, consumers are buying what they perceive to be the freshest foods available—a trend one Commerce Department spokesman says is due to today's "behavioral psychology." According to the Food Marketing Institute, the majority of nationwide supermarkets have experienced an increase in fresh produce sales of nearly 2 percent since 1982. And the actual selling area devoted to produce, as well, has increased 2 percent since 1979, says FMI.

"Consumers no longer perceive canned foods as good," says the market analyst.

DIANNE L. TAYLOR,
Associate Editor

Annual Growth Rate of Advertising Dollars By Industry 1985 Projections

Industry	SIC no.	Annual growth rate (%)
Food & Kindred Products	2000	4.9
Meat Products	2010	12.5
Dairy Products	2020	9.6
Canned-Preserved Fruits-Vegs	2030	8.6
Flour & Other Grain Mill Pds.	2041	8.7
Wet Corn Milling	2046	-10.4
Prepared Feeds for Animals	2048	8.6
Bakery Products	2050	-2.1
Cane Sugar Refining	2062	-6
Beet Sugar	2063	-5.3
Candy & Other Confectionery	2065	7.6
Malt Beverages	2082	18.2
Distilled Rectif Blend Bevrgr	2085	3.8
Bottled-Canned Soft Drinks	2086	6.9
Food Preparation NEC	2099	8.3

Source: Schonfeld & Associates, Inc., Evanston, Ill.

The food industry is expected to outpend all other industries in advertising dollars this year, according to Schonfeld & Associates. The food industry's advertising expenditures are growing more rapidly than those of any other trade, says the firm.

The council's attempt to gain market share through an emphasis on advertising is not unusual in the food industry these days. Food industry advertising and sales promotion spending is expected to outpace advertising/sales promotion spending by all other industries—even the drug industry—according to Eugene Schonfeld. Schonfeld is head of Schonfeld & Associates, an Illinois-based firm which tracks nationwide advertising

expenditures.

Food industry outlays will total \$4.65 billion in 1985, he predicts, resulting in a 4.5 percent increase over 1984. Schonfeld arrived at his data through the analysis of financial statements of all publicly-owned food companies.

"It's important to note," concludes Schonfeld, "that some food firms finish far below the advertising average, while others finish far above the average."

Efforts will continue

Supporters of the Canned Foods Information Council—which include over 100 corporations from the food, can manufacturing and iron/steel industries—are hoping this "behavioral psychology" stumbling block can be overcome through marketing and advertising. "We have had quite a positive response from our ad," says Council Spokeswoman Julie O'Rourke. "It's a \$16-billion industry."

The \$1-million spent on the two 30-second Super Bowl spots is no small drop in the bucket, considering the council's budget for 1984 was only \$2.5 million. Budget projections for 1985 are in the range of \$4 to \$5 million.

The commercial itself, which cost \$155,000 to develop, stars a sexy female robot/android from the year 3,000 who

(Continued on next page)

Number of Food Cans Manufactured Annually (in billions)

1978	30.3
1982	27.6
1983	27.0
1984	27.5*
1985	27.0*

*estimates
Source: U.S. Dept. of Commerce

Though 1984 will be an exceptional year for food can manufacture due to a good overall harvest, there is no demand for canned foods, says the Commerce Department, and demand will decline over the next five years.

NEWS/EVENTS

touts the convenience and nutrition of canned foods. She calls them 'items that astronauts might take on a trip to Jupiter in the year 3,000.'

The commercial is reportedly 'the first of its kind, marking the first time that a character with truly fluid, human movement has been created by a computer. Since the Super Bowl, it has been aired on at least three additional television shows.

Twin-screw extrusion conference a success

A week of full-day seminars and processing demonstrations addressing the technical and economic aspects of twin-screw extrusion recently drew over 1,300 individuals. The conferences, sponsored by Werner & Pfleiderer, drew representatives from both large, small and medium-sized food firms.

President Reagan salutes food firms

As part of a new program to honor the private sector for outstanding contributions to society, President Reagan recognized six major food firms.

The president, as part of the President's Citation Program for Private Sector Initiatives, cited these companies:

- **Kraft, Inc.** for its sponsorship of the Annual 4-H Health Awards Program. Kraft and 4-H also produced a film on substance abuse and is actively involved in the Adopt-A-School Program.

- **Nabisco Brands** for the donation of over 14-million pounds of food to the needy through nationwide food banks.

- **General Mills, Inc.** for its development of alternative long-term care programs that allow the elderly in the Minneapolis-St. Paul area to remain at home and independent.

- **Beatrice**, also for the donation of food products to the needy—almost \$2-million worth. Beatrice also has two annual recognition programs to encourage public service activities.

- **Anheuser-Busch, Inc.** for its outstanding support of the Summer Jobs for Youth Program and its community involvement in St. Louis.

- **Consolidated Foods** for donating \$3.5-million in cash and \$6.5-million in products to the needy this year and for its annual \$100,000 leadership award to the non-profit organization with the most innovative program for the economically disadvantaged.

We haven't seen the end of postal hikes

Higher postal rates—beyond those that have just gone into effect—are already under discussion at the U.S. Postal Service. Some postal officials privately consider the new rates to be only "interim" steps, putting the new Postmaster General under pressure to raise rates further in the next year or two.

A special effort is cooking to boost third-class rates even sooner. Chairman of the Postal Service Board of Governors John R. McKean warns that his group does not believe third-class rates were raised enough this year (13.8 percent) and intends to "consider this matter closely and determine what additional steps we might take, outside the context of an omnibus rate proceeding," to kick up third-class charges.



Equipment! You'll see it all at Food & Dairy Expo '85

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Expo for products and services to increase productivity and profits.

Atlanta is a great city. And Food & Dairy Expo '85 will make Atlanta the place to be, October 5-9, 1985.

Make your plans now to be there!



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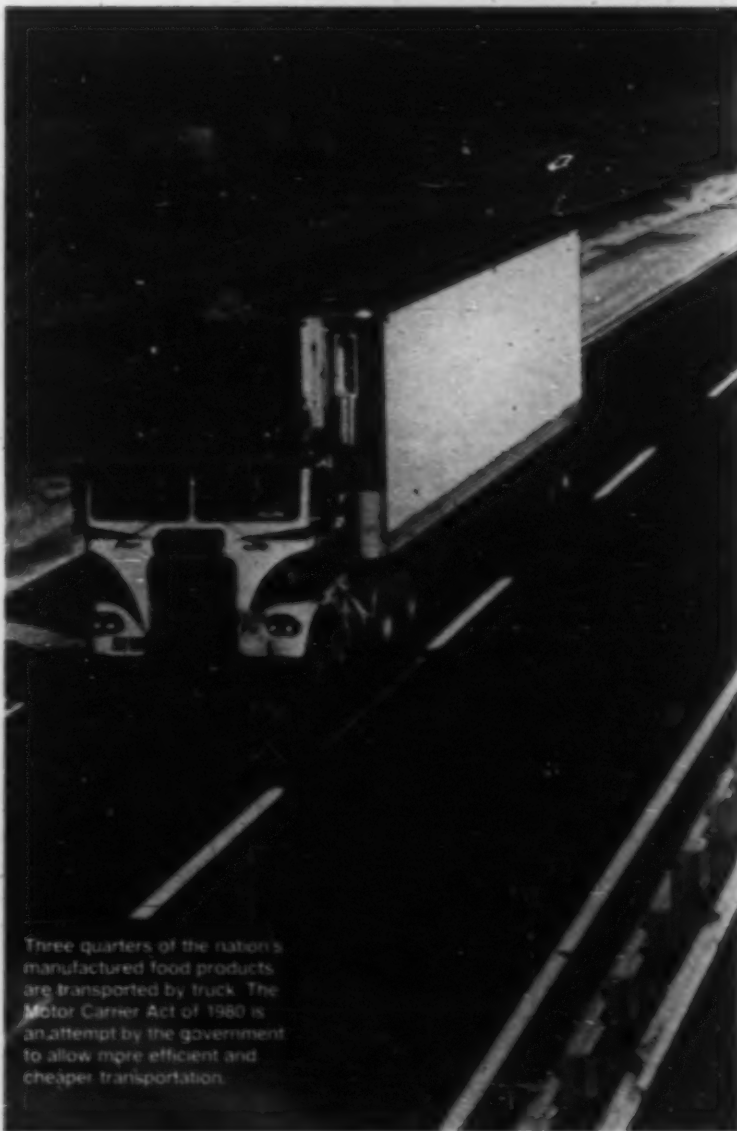


Dairy & Food Industries
Supply Association
6245 Executive Boulevard
Rockville, Maryland 20852
(301) 984-1444
Telex: 908706 - DFISA ROWE

DISTRIBUTION/TRUCKING

DEREGULATION: IS IT WORKING?

Deregulation has apparently been good for private carriers and bad for unions. But is it good for the food industry? Congress is now reviewing the legislation.



Three quarters of the nation's manufactured food products are transported by truck. The Motor Carrier Act of 1980 is an attempt by the government to allow more efficient and cheaper transportation.

According to the most recent Census Commodity of Transportation Survey figures, over 313 million tons of manufactured food products are hauled by truck in the U.S. per year. Over two-thirds of this is hauled by private carriers. Because they are dealing with perishables that could require special handling, many food companies started their own private fleets. Towards the end of the '70's, rising fuel costs, insurance rates and maintenance costs forced private carriers to look for ways to become cost effective. Then came deregulation.

Because of the Motor Carrier Act of 1980, suddenly private carriers were allowed to offer an array of services. Fleets could now become "for hire" carriers. Food companies could set up transportation subsidiaries which could apply for their own authority. Private carriers could pick-up backhauls for other companies. They could also haul goods from one division of a company to another, (previously illegal). This increased the total available supply of carriers, and helped cut rates.

In the latest round of Senate subcommittee oversight hearings on the Motor Carrier Act, testimony was taken from several prominent industry figures, including representatives from transportation companies, unions, associations, securities analysts, and the Interstate Commerce Commission.

According to Charles R. Marcoux, President and Chief Operating Officer of Leaseway Transportation Corp. the Motor Carrier Act of 1980 has, without question, delivered the economic benefits to the U.S. economy that were promised. Transportation deregulation combined with improved information management have accelerated inventory velocity to unprecedented performance.

BILL DRENNAN
Senior Editor

Under regulation, the more efficient operators were constrained from expanding and the less efficient were protected by rate regulation and entry restrictions. Since 1979, a number of carriers who were not cost-competitive have been liquidated. Virtually all of these carriers were in poor condition prior to the Motor Carrier Act, says Marcoux. "Deregulation simply hastened their demise. Regulation was like a life-support system that slowly undermined the long-term vitality of our business."

Deregulation freed carriers to go where the freight was, not simply where their operating authority required them to go. Allowing private carriers, for example, to haul inter-corporately without compensation and to form transportation subsidiaries enabled them to significantly reduce their empty backhauls.

Marcoux indicates that total employment in truck driver and delivery driver occupations appears to be at near record levels, according to U.S. Census figures. Looking at the trucking industry alone — that is, not including private carriage and other trucking services provided by non-trucking — employment in 1983 was 4.7 percent below the 1980 level. This decline in employment in traditional trucking companies indicates that manufacturers, retailers and distributors are utilizing alternate methods of highway transportation. Teamster union members have borne the brunt of this transition. Most of the large carriers who have gone out of business employed teamster labor.

Another source of savings under deregulation, according to Marcoux has been the reduced profitability of the trucking industry. This dissipation of earnings cannot be entirely explained by deregulation. The recession and bad management also played a role.

Further action needed?

While most of the Motor Carrier Act of 1980 deals with the economic regulation of the trucking industry, Section 19 calls specific attention to the problem faced by the motor carrier industry as a result of state licensing, registration and filing requirements. Section 19 required the ICC and DOT to prepare a report to Congress on this subject.

The report specifically found that current requirements imposed on interstate carriers have evolved over the past 60 years from simple registration of vehicles to a complex structure. The additional burdens of registration, fuel taxes, privilege and use taxes, property taxes, third structure taxes (e.g. ton-mile, weight-distance and gross receipts taxes), ad valorem and sales taxes and fees for initiating tax accounts, purchasing decals and implementing safety programs still have a strangle-hold on our industry. Along with these multiple fees

have come a myriad of administrative requirements. The burdens continue to multiply and no solution that strikes at the core of the problem has emerged.

The time has come, says Marcoux for Congress to make a serious high-level review of the way federal, state and local governments tax motor carriers operating in interstate commerce. Not only does this morass of tax structures pose an unreasonable burden on carriers, but we believe you will find that it costs almost as much to administer many of these taxes as the taxes collect.

According to James Voytko, Vice President, PaineWebber Inc., how any trucking company has fared thus far under the new, more freely competitive environment produced by the Motor Carrier Act of 1980 has been predominantly a function of two factors:

- How efficient (or cost-effective) they have been versus their competitors in producing trucking services; and,
- How successful they have been in meeting the specific service requirements of shippers at competitive rates.

The real issue, according to Voytko, is whether the trucking industry is offering a complement of services more closely tailored to the shippers' needs, and doing so in a more efficient manner. On this score, he feels that the Motor Carrier Act of 1980 has been a big success. Deregulation has prompted innovation and modernization. Since 1980 dozens of pricing plans have been introduced, all designed to enhance profitability, build market share, create dependable service and rate commitments, simplify rates or match rates more closely with actual costs. Rail/truck service links have increased dramatically, giving shippers a service not often available to them in the past.

One of the most prominent effects of the Act has been the gradual emergence of a new sense of economic realism in the dealings between labor and management. Wage levels must now reflect the prospects for the industry, without artificial help from the government.

The qualitative approach

1. The industry is consolidating. Efficient companies with good business niches, management and financing are benefiting at the expense of those, which for one reason or another, cannot hold onto the shipper's freight.

2. The customer's influence has grown. In the competition between trucking companies for the right to command a share of the industry's tonnage, revenue and profits, the shipper appears to have a vastly greater "say" since the passage of the Motor Carrier Act.

3. The industry is becoming more volatile

(Continued on next page)

"A troubling outgrowth of these deregulation business failures is the wrongful use of bankruptcy proceedings by unscrupulous managers to abrogate union contracts."

"Food companies can now set up their own transportation subsidiaries which can apply for their own authority. Backhauls for other companies have now become a profitable possibility."

DISTRIBUTION/TRUCKING

because it is more competitive.

4. The general decline in for-hire trucking rates is giving some parts of the industry new life by making them competitive once again with some private fleets.

5. The union/non-union split in the industry is a constant source of competitive jostling.

6. Innovation has picked up within the industry in the form of new ventures allied with traditional trucking operations like piggyback forwarding, import/export services, rail/truck combinations, varied marketing and pricing strategies and new labor arrangements.

Private Fleet Tractor-Trailer Operating Data

	Annual Miles Per Tractor	Per Cent Empty Miles	Cost Per Mile Current \$	Constant \$
1981	100,300	22%	\$1.25	\$1.25
1982	91,100	24%	\$1.26	\$1.19
1983	97,000	21%	\$1.29	\$1.18

Fewer empty miles, and a lower real cost per mile are part of the results of the Motor Carrier Act of 1980, according to statistics on private fleets compiled by A.T. Kearney Management Consultants for the Private Truck Council of America. The cost per mile to operate a tractor-trailer in a private fleet has decreased in each of the past two years.

Backhaul Test Activity Comparison By Market

Market	% Pick-up Tonnage Prior to Test	% Pick-up Tonnage During Test
Los Angeles, CA	9%	72%
San Francisco, CA	12%	68%
Phoenix, AZ	0	47%
Buffalo, NY		
Syracuse, NY	2%	35%
Albany, NY		
Scranton, PA	49%	79%
Richmond, VA		
Norfolk, VA	0	38%
Roanoke, VA		
Baltimore, MD	0	32%
Kansas City, KS	59%	74%
Wichita, KS	0	65%
Springfield, MO	0	58%
OVERALL	10%	54%

Borden, Inc. introduced a Backhaul Program in test markets in March, 1982. A comparison of the percent of total tonnage backhauled prior to and during the test shows significant interest in the program. Over \$200,000 was given back to customers in the form of backhaul allowances during this initial test period.

In contrast, Thomas J. Donohue, Executive Vice President and Chief Executive Officer, American Trucking Associations, Inc., does not believe that the Motor Carrier Act of 1980 has been completely beneficial. Says Donohue, "Because the first two years of deregulation were accompanied by two strong recessions, which alone could have affected the industry very negatively, it is too early to draw any sound conclusions. ATA opposes changes in the present collective ratemaking procedures. A decision on pending legislation to maintain or alter the system should be deferred until a more precise review of the effects of the Motor Carrier Act is completed."

"In addition," adds Donohue, "the implementation and enforcement of existing laws by the Interstate Commerce Commission has been inconsistent with the intent of Congress. The ICC has unilaterally gone further towards a deregulated trucking industry than Congress has directed."

While Donohue admits there were profitability gains in 1983, he claims the financial condition of the motor carrier industry in general continues to be weak. "Reasonable profits are critical if the regulated industry is to make long overdue investments in equipment and related capital expenditures."

Due to an inability to remain profitable, Donohue says that numerous carriers have gone out of business, filed for bankruptcy or severely curtailed operations. By 1982, the number of such carriers had reached some 350 established firms with \$3.2 billion in revenues and 67,000 employees. This trend has continued throughout 1983 and 1984.

Also opposed to deregulation was Raymond J. Fularczyk, Secretary-Treasurer, International Brotherhood of Teamsters. According to Fularczyk, deregulators failed to anticipate the prolonged duration and painful intensity of restructuring traditional markets. In their haste to apply cost/benefit analyses and project huge savings for consumers, theorists refused to acknowledge the vulnerability of the worker during deregulatory transition. Deregulation has exacted a tremendous price in human terms from Teamster members.

ICC policies of open entry and over-extended grants of operating authority have set in motion processes which have drastically altered the trucking industry, says Fularczyk. "The Commission has abandoned public need and fitness tests by approving nearly 95% of applications for new and extended authority."

Fularczyk points out that an unprecedented number of well-established carriers have gone bankrupt since implementation of the Motor Carrier Act of 1980. According to the American Trucking Association, 350 carriers have

(Continued on page 109)

failed since 1980.

"A troubling outgrowth of these deregulation business failures," says Fularczyk, "is the wrongful use of bankruptcy proceedings by unscrupulous managers to abrogate union contracts. It has become increasingly common for transportation firms to attempt to lower costs by pursuing exploitive labor policies. Heavy-handed threats to coerce give-backs in wages and fringe benefits from employees by threatening bankruptcy has become a stock weapon in management's arsenal against labor."

Fularczyk feels that the trucking industry has deteriorated. It resembles the chaotic environment of instability that existed prior to 1935. "This atmosphere of instability was the primary factor which led to the initial regulation of trucking in the United States. Knowledgeable economists are projecting a shakeout in the industry which will leave only the largest carriers in sound financial condition."

What Congress should do

Fularczyk lists several actions he feels Congress should take:

- Direct the ICC to implement the Act in accordance with Congressional intentions.
- Direct that displaced workers should have priority hiring rights when other regulated carriers expand.
- Direct that before grants of operating authority are tendered, the Commission must determine that carriers are capable of providing the service petitioned and that the service would satisfy some public need.
- Investigate the practice of "predatory pricing" and mandate that trucking rates must cover costs.
- Require not less than \$1 million minimum level of financial responsibility for non-hazardous cargo.
- ICC and USDA enforce the section of the Act that calls for "written contracts pertaining to certain interstate movements by motor vehicles." Owner operators should be considered employees for the purposes of labor law and be guaranteed the right off collective bargaining.

Problems with states

One point on which most of the witnesses agree, is that state regulations have become quite burdensome. Mr. Donohue states, "increased and new taxes by the states are creating artificial barriers to interstate commerce."

John G. Sarefield, of Borden Inc., Columbus, Ohio, testifying on behalf of The Private Truck Council of America, Inc., states that new options, available on the federal level, are not readily available on an intrastate basis due to intransigent economic regulation at the state level. Some 44 states still regulate entry into the

trucking industry, and the vast majority of states have not been as liberal as the federal government in amending regulations and policies to make private fleets more productive.

"Differing economic regulations at the state and federal levels," says Sarefield, "means many private fleets are unable to use the federal options because some of their truck operations are intrastate in nature. The choice is either to separate one's fleet into interstate and intrastate sections (an expensive and impractical solution) or to comply with the most restrictive set of regulations applicable to one's fleet." □

Borden Backhaul Participation

(% of total through warehouse tonnage)

	(1981) Prior to Deregulation	1st Year Borden Program	2nd Year Borden Program
Eastern	9%	49%	53%
Central	17%	41%	38%
Southeast	27%	38%	42%
Southwest	14%	30%	34%
Western	18%	63%	64%

This chart shows the results of backhaul by Borden, Inc. for the first full year and year-to-date 1984, compared to the year prior to deregulation. There was a dramatic increase from 17% to 45% of Borden's total through warehouse tonnage being backhauled.

Employment In Specific Transportation Occupations

	(In thousands)			
	1980	1981	1982	1983
Delivery & Route Workers	598	563	574	365*
Truck Drivers	1,878	1,878	1,841	2,195*
Total	2,476	2,441	2,415	2,560*
Percent Change Year to Year		-1.4%	+0.4%	+4.4*

*The Census Bureau revised its employment categories for 1983, making 1983 data less than perfectly comparable with earlier years.

Source: "Handbook of Labor Statistics"

According to U.S. Census figures, total employment in truck driver and delivery driver occupations appears to be at or near record levels. Not including private carriage and other trucking services provided by non-trucking companies, employment was 4.7 percent below the 1980 level. Teamster union members have borne the brunt of this transition.

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In this issue:
ENGINEERED FOODS

Chilton's **Food Engineering**

MAY 1985

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Food in the Year 2000

Some people think food
will look like this someday.
They're wrong.

What we eat in the future may not change that much. The same may not be said for the industry that manufactures foods and beverages. Survival in the food industry will not be easy. For the survivors, however, the next 15 years could be a "golden age".

See our special survey article on the future of the food industry, beginning on page 90.

Also in this issue:

IFT Pre-Show Report

Fiber-Enriched Foods

Creative World of Food Patents

Chilton's Food Engineering



ABOUT THE COVER

What does the future hold for the food industry? While it's risky to forecast, we've gathered views from throughout the industry and added them to our own conclusions.

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Dietary fiber still defies definition and uniform analysis. But that isn't stopping processors from developing new high-fiber and fiber-enriched products.

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Coming from every corner of the U.S. and around the world, food industry scientists and managers will descend on Atlanta to refresh old friendships and learn what's new.



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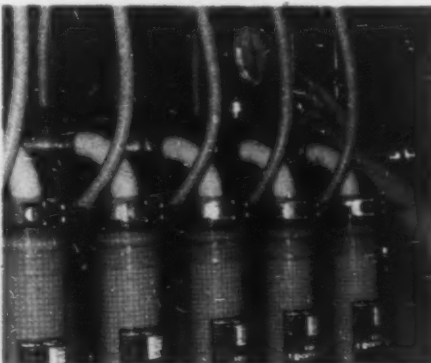
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Special Emphasis

QUALITY CONTROL EQUIPMENT

Special focus is given to Quality Control equipment in this month's new product section.

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FOOD IN THE YEAR 2000

Looking into the future is risky business. But unless we plan ahead we may not be ready for what promises to be an even more competitive business by 2000.

OTHER VIEWS...

We don't have all the answers to the future. That's why we asked a number of experts to give us their thoughts on the food industry in the year 2000. Their comments help us further focus on a new world just fifteen years away. These other viewpoints of the year 2000 begin on page 102.

If you think the food industry is competitive today, wait 15 years. By the year 2000 we will truly have a food fight. On the other hand, it's a future worth fighting for. Industry profits will be up, the market affluent, technology diverse and creative.

The next fifteen years will remold the structure of the food and beverage industries. By the year 2000 there will be two kinds of food companies in the United States. One will be a giant, a conglomerate of many food companies with plenty of marketing muscle and distribution power. There could be just a dozen or so of these mega-giants.

The other kind of firm will be far smaller. It may have but one or two products. It will market these products creatively—through direct mail, consumer parties, video catalogs and devices we cannot today envision. Both its products and its manufacturing and marketing

WILLIAM H. LEMAIRE
Editorial Director

techniques will be outside what we call the mainstream today. In fact, they may do very little manufacturing at all. There could be thousands of these firms, many of them driven by entrepreneurs. Some of these companies will be built around new ideas in technology such as irradiation or enzymology.

Both corporate structures will market to an America whose values will have changed but whose basic diet could be remarkably like today's. You may have futuristic cars, you might do a lot of your work at a computer, you may live in geodesic domes, but you will still be eating fruits, vegetables, dairy products, and meat. What will change, and change even more dramatically than to date, is the packaging and processing of these products.

Food companies will seek an increasing amount of value-added preparation. As Dr. Dee Graham, director of technology development at Del Monte says: "The food industry has moved from selling the commodity, to selling the partially formulated product, to selling the wholly formulated product. As an example, first came flour, then cake mix, and then ready-to-eat cakes."

The food consumer in the year 2000 will be impatient with weekday food preparation and seek a high degree of convenience with no stinting on quality. The same consumer, at leisure, will enjoy weekend cooking only when it is fun or exotic.

Dr. Graham's view represents just one of many industry perspectives used to prepare this article on the future of food and the food industry. We went seeking thoughts on the future and we found plenty. One thing is obvious from our search. Those food conglomerates we talked about are already preparing for the future. As you read this article they are accumulating population projections and demographic trends. They are getting ready for the year 2000. So should we all. Fifteen years may sound like a long time but if you want to be a force in the market of the future, you need to develop strategies today.

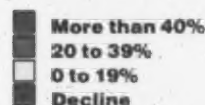
"What the big boys eat"

The baby-boomers take over and make their mark on America

When *Wheaties*, fueled by one of the most successful slogans in food promotion history ("the breakfast of champions"), suddenly became "what the big boys eat", you knew the baby-boom generation had arrived. Candy commercials are not aimed at just little kids anymore. Television commercials show truck drivers, waitresses, and office workers talking about how a candy snack satisfies their hunger till the



POPULATION GROWTH 1980-2000



U.S. Census Bureau projections show that the population of the western U.S. will rise by 45 percent between 1980 and 2000. Meanwhile, growth in the midwest will stay pretty much on an even keel, while the northeast declines substantially.

next meal. Even toothpaste commercials are aimed not at that dreaded childhood affliction of cavities, but at romance stifling plaque.

"Boomers", those people born between the end of World War II and 1962, are just beginning to reshape America. There are some 74 million of them; they are affluent; they are materials-oriented; they have high expectations. Some people say they are spoiled. On the other hand, their demand for quality, convenience, health, and luxury is what could propel the food industry into a "golden age" of profitability and power.

Lean Cuisine, Stouffer's low-calorie frozen food entree, is the classic baby-boomer food. The quality is high, the portion ample, but not too filling, and it's convenient--three minutes in the microwave. The fact that it is also expensive didn't keep Stouffer's from ringing up \$300 million in sales in 1983 from the product.

Boomers are not anti-children but they'll have fewer of them. And while U.S. family size may decline somewhat, these families will be wealthier than ever. Families with incomes of at least \$30,000 should increase 62 per cent between 1980 and 1995. Families earning \$50,000 will grow even faster, up 137 percent according to some projections. By 1995, one family in five will earn at least \$50,000 annually, up from just one in ten in 1980.

The year 2000 will, as *FORTUNE* magazine says, "mark a millenium for marketers, with the boomers in their prime spending years of 40-54."

While this "land-of-plenty" scenario may

sound like the marketing equivalent of shooting fish-in-a-barrel, it won't be. As the baby-boom generation marches through life, both as consumers and workers, its movement will be like a large wave with some sectors of the market cresting, others sagging. Riding the whims of this market will be the key to financial success. In other words, the consumer of 30 has a different purchasing agenda than at age 60. Keeping on top of these ebbs and flows in demand and desire, will make sociologists of many marketing men and women. For example, in just ten years from now there will be five million more children in America, but nine million fewer teenagers. At the same time, the number of Americans aged 31 to 56 will soar by over 20 million.

The graying of America

What happens when the baby-boomers face mortality?

Perhaps the foremost point to make in planning for the food industry in the year 2000 will be the age of the consumer. In fifteen years, 30 percent of the population will be between 35 and 54 years. In that same time frame, those 55 years and over will be about 22 percent of the population. In other words, over half the U.S. population will either be facing 40 or 60, two of the most significant aging dates in our personal evolution.

The baby-boomers, you might say, will be

(Continued on next page)

TRENDS/FUTURE FOOD

facing their own mortality in the year 2000 and that has a way of changing the way people view life. It will also affect the way they eat.

"The 90-year-old man of the future will have the physical vigor of a 50-year-old man of today," says gerontologist Roy L. Walford in *The Futurist* magazine. Baby-boomers, already an active group of joggers, swimmers, etc., will seek ways to lengthen their life. This need for health and well-being led Campbell's CEO Gordon McGovern to redirect Campbell's from a conservative canning company to a youth-oriented, "fitness company".

But the boomers are getting older. They have grown accustomed to a society that finds solutions to problems. They are not fatalists. They will want a way to live longer. And, in fact, some gerontologists estimate that by the year 2000 there could be over 100,000 people in the country over the age of 100. One of the philosophies that may appeal to some of them is called "undernutrition".

After 30 years of research on aging, work at the University of California Medical Center in Los Angeles suggests that one key to living longer is eating less. The idea revolves around a spartan, low-calorie diet rich in vitamins and minerals—undernutrition without malnutrition you might call it.

Gerontologist Walford, quoted earlier, who heads the medical center program, eats 2,100 calories a day, fasting two consecutive days a week. While that may not sound like a trend that would sweep the country today, consider these two factors. Already we see an age of abstinence emerging with low-alcohol, low-calorie, low or no-caffeine. Combine that with a large population, accustomed to taking care of itself, and facing mortality square in the face. "Undernutrition" or any number of other dietary philosophies will have appeal in 2000.

As this population moves into the 21st Century and truly becomes elderly, another row of hurdles faces the food processor. Because, with old age, comes a loss in the ability to smell, to

distinguish certain foods. A recent study at the University of Pennsylvania confirmed that the sense of smell diminishes with age. "Given these findings," the report says, "it is not surprising elderly persons complain their food lacks flavor." The study not only asserts that the ability to smell and distinguish odors drops off with age but also that women have a more acute sense of smell than men at any stage in life. These, again, are simple facts that the food developer of the future must consider.

America's schizophrenic diet

Food brings out the two sides of our nutritional soul

The most dominant theme of the American diet in 1985 is light-and-low. America has become interesting for what it is *not* eating. Chicken and seafood consumption are on the rise. Pork and beef sales are less successful. Sugar consumption, per person, has plummeted to 67.5 pounds in 1984 from 100 in 1980. Bottled water usage per person in the U.S. has shot up to 3 gallons; diet sodas are now at 8.3 gallons per capita; alcohol, on the other hand, is down to 2 gallons. A recent article in *FOR-TUNE* magazine called this phenomenon "America's New Abstinence".

But marketing in America is a mine field. Trends, while important, have counter-trends running parallel. This is nowhere more evident than in the food industry. The dairy industry, responding to the public's concern over cholesterol, has come up with an array of lower-fat milks, yogurts, and other products. At the same, advertisements touting "cheese, glorious cheese" have kept high-fat cheese sales skyrocketing. Cheese is as much a Yuppie essential as white wine.

Low-calorie, low-alcohol beers maintain a solid pace in sales right along with heavier,

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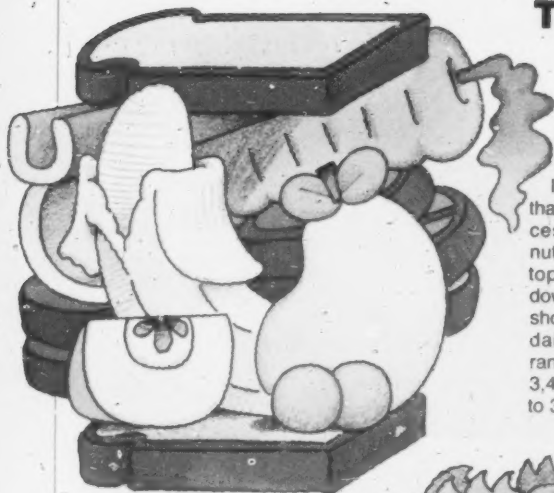
The elderly population is expected to continue expanding into the year 2000...and beyond, as the forefront of the baby boomers reach 65 in 2010.

ELDERLY POPULATION: 1980-2040

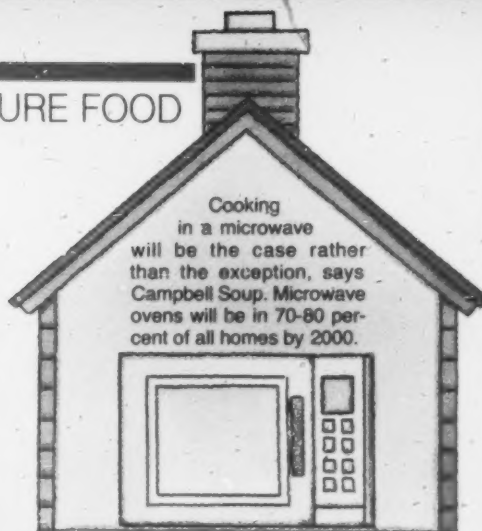
	65 YEARS AND OLDER		75 YEARS AND OLDER		85 YEARS AND OLDER	
	Number (in millions)	% Increase in Preceding Decade	Number (in millions)	% Increase in Preceding Decade	Number (in millions)	% Increase in Preceding Decade
1980	25.7	28%	10.1	32%	2.3	59%
1990	31.8	24	13.7	37	3.5	52
2000	35.0	10	17.3	26	5.1	48
2010	39.3	12	19.0	9	6.8	33
2020	51.4	31	21.6	14	7.3	8
2030	64.3	25	29.9	38	8.8	20
2040	66.6	4	37.5	25	12.9	47

SOURCES: BUREAU OF THE CENSUS AND AMERICAN DEMOGRAPHICS MAGAZINE

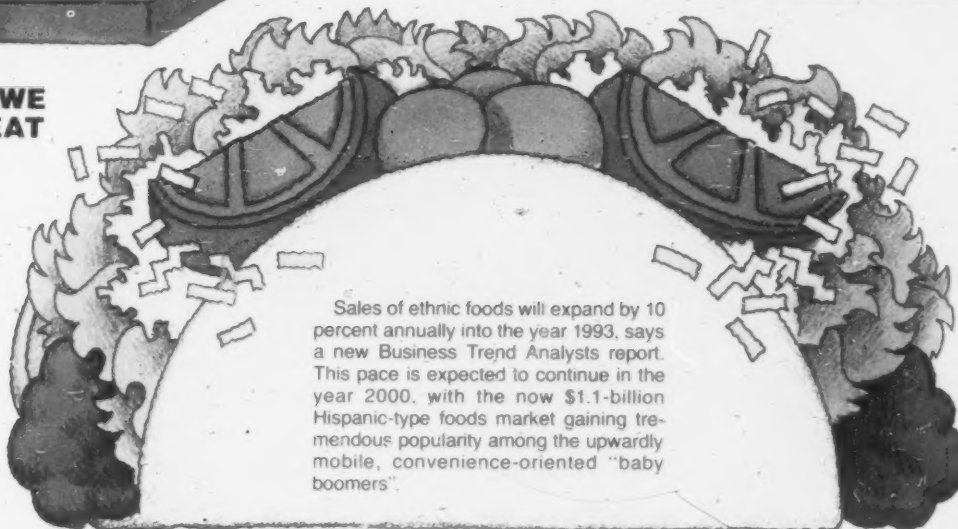
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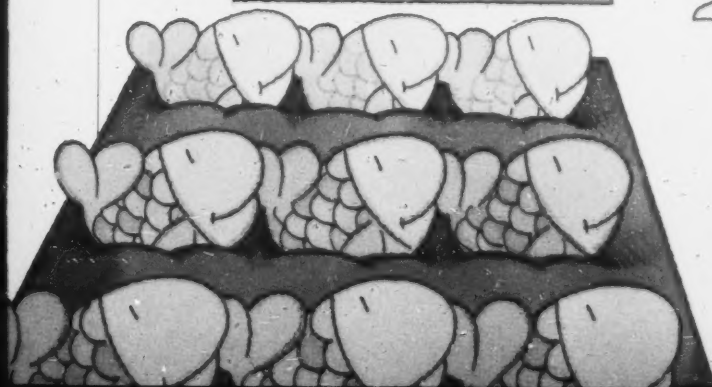
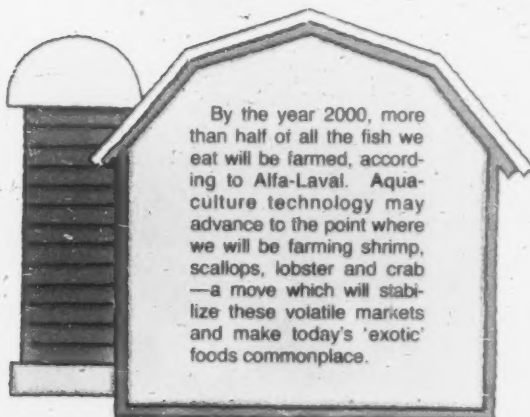
Industry onlookers agree that developing fresher processed foods with good nutritional benefits will be top priority fifteen years down the road. Forecasts show that caloric per capita daily intake—which now ranges between 3,300 and 3,400—will decline to 3,000 to 3,100 by 2000.



WHAT WE WILL EAT



Sales of ethnic foods will expand by 10 percent annually into the year 1993, says a new Business Trend Analysts report. This pace is expected to continue in the year 2000, with the now \$1.1-billion Hispanic-type foods market gaining tremendous popularity among the upwardly mobile, convenience-oriented "baby boomers".



As the population grows older and disposable income increases, consumers will demand more sophisticated, convenient food dishes—many of them in the form of frozen entrees, agree industry sources. "Premium" frozen food sales will quadruple by 1990, says a Find/SVP market survey, and are expected to continue their momentum into the year 2000.

TRENDS/FUTURE FOOD

FAMILIES BY INCOME: 1980-1995

	1980	1985	1990	1995
All Families	60,701.8	64,404.8	68,087.9	71,809.0
Less than \$10,000	9,385.4	9,402.6	8,902.3	8,330.3
\$10,000-\$19,999	15,023.6	15,353.7	14,572.6	13,593.7
\$20,000-\$29,999	14,167.0	14,427.4	14,414.4	14,020.0
\$30,000-\$39,999	10,101.0	10,635.1	11,497.8	12,027.3
\$40,000-\$49,999	5,721.7	6,557.9	7,779.9	8,915.7
\$50,000 and over	6,303.0	8,028.1	10,920.9	14,922.0

(FAMILIES IN THOUSANDS; INCOME IN CONSTANT 1982 DOLLARS)
SOURCES: DATA RESOURCES AND AMERICAN DEMOGRAPHICS MAGAZINE

Clearly, average income for family households will increase by 1995; and this trend is expected to continue into 2000. The number of families earning less than \$30,000 annually will decrease, while the number of families earning \$30,000 and over will increase. Families with incomes of \$50,000 or more per year show the most significant increase.

maltier, calorie-laden import beers. Low-fat yogurts and low-calorie "ice-cream" co-exist in a market where Haagen-Dazs and other pricey ice creams, laden with butter fat, thrive. Another exception to the abstinence-trend is candy. Sales of some items, particularly premium chocolates, enjoy success in a land where calories are anathema. What all this adds up to, you might say, is confusion. But, in fact, what it does mean is that, in the American food industry, marketing is nearly everything. Those products running counter to the abstinence trend all sell the consumer something he'd like, usually image or the idea that you've saved all those calories drinking skim milk so why not splurge on some herbal, goat-milk cheese from France. America's food giants think treating food as a commodity is a sin. Anything can be dressed-up and sold for more. Quaker Oats, in 1985, will spend around \$400 million on advertising and promotion. Campbell Soup Company will increase its promotion budget by a whopping 40 percent.

The important point to recognize is that this desire for both rich, calorie heavy foods and low-calorie, low-alcohol, "abstinence" foods is a creation of the baby-boomers. They'll carry this split personality with them right into the 21st Century.

The urge to merge

Can the food industry be owned by 50 corporations in the year 2000?

Figuring out what Americans will want to eat in the year 2000 could be the easiest challenge facing the food industry. For many, just holding onto their company will present plenty of mental exercise. The pace and significance of industry acquisitions and mergers hit a high-water market in 1984. In the twenty years from 1948 to 1968 a total of \$5 billion was spent on acquisitions. But in just one year, 1984, that figure was smashed by just two buy-outs (Nestle/Carnation for \$3 billion and Beatrice/Esmark for \$2.6 billion.). There were

581 other acquisitions in 1984. The future strategies of America's major food manufacturers is clear: buy your way into new markets or distribution channels, then use plenty of marketing clout to increase market share.

Using some statistical projections, a USDA economist estimated a few years ago that 50 food corporations could own all the food manufacturing assets in the U.S. by the year 2000. Based on current rates of consolidation you can produce a statistical aberration like that. While more and more sales and assets will reside with a leading 50 or leading 100 food corporations by the year 2000, this doesn't mean everybody else is going to disappear. Actually there's plenty of room for entrepreneurial-type firms in the food industry. If they have a clear focus on their market and are well capitalized, they can do well.

New business formations in the United States increase at a rate of 500,000 new incorporations annually. A number of these will be in the food industry. In a recent speech, Frank Panyko of The Food Institute noted that while some sectors of the industry were losing companies there were gains in other areas. While the number of fruit and vegetable canners has been cut in half in 15 years, for example, over 50 new fruit and vegetable freezers launched businesses in the last ten years. In the baking industry, there are half as many bread and cake bakers today compared to fifteen years ago. But in another category--cookie makers--there are more today than in 1967.

As mentioned at the beginning of this article, two kinds of food firms will exist at the turn of this century. On the one hand will be large, multi-billion dollar conglomerates, perhaps account for 80 percent or more of food industry shipments and sales. Then there will be a kind of alternative food and beverage industry consisting of smaller, maybe regional, specialty firms with a unique product or marketing technique. The product line may not represent the volume a large company would need to compete. In other words, the way to compete in the food industry in 2000 will be to go where the food giants cannot afford to compete.

This ducking and weaving between the large food companies will not be without danger. To meet the changing consumer demands of the year 2000 companies must take certain risks. Increasingly the risk-taking will be done by smaller, idea-driven firms. One of their niches in the market will be to experiment with new ideas in technology, such as irradiation, supercritical extraction, controlled atmosphere packaging.

Some of these smaller companies may find a profitable niche by utilizing new marketing approaches. Some in the food business are

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already experimenting with cable television, home computers, electronic fund transfer. "Teleshopping" and a variety of non-store marketing techniques will play a major role in the food marketing schemes of the future. For people who do not have the time to prepare food, it is only a matter of time before they decide they have little time to go to stores, wait in long lines, or put up with the other irritations of store shopping.

If a new production, marketing, or packaging idea fills a need in the quality and time conscious America of 2000, any company, any size, can prosper. These companies can operate on their own or wait for a larger corporation to drive up to their door with the money truck.

Here's an example of a small firm, filling a small niche, but then making it big. Tofu Time, Rahway, NJ, produces, as you can tell from the name, tofu products. In their first year of operation in 1983 they produced around \$1 million in sales with no profit. In their second fiscal year, ending in 1985, they should produce just under \$8 million in sales with a net income of just under \$1 million.

Squeezing out profits

If acquisition is a central strategy, it will take higher-than-traditional profits to keep the company competitive

Acquisitions. Product development. Big marketing budgets. Running a major food corporation in the year 2000 will take money,

more money than many food giants make today. Corporate advertising and promotion budgets for many large companies are already at a staggering 20 percent of sales. On the whole, however, the food industry is financially sound as a rock. Balance sheets are strong, in some cases produce a return on equity of around 20 percent and this, of course, is what has attracted so much acquisition attention. But despite a sound financial picture, profits could improve and that's where a lot of CEOs will focus their attention from now until 2000. Last year, for the industry as a whole, food processors turned in a respectable 8 percent gain. The goal now will be to push profit numbers into double digits.

Listen, for example, to Tylee Wilson, chairman and CEO of R.J. Reynolds, owner of Del Monte. "This is a pretty aggressive plan but we believe we can achieve it." The aggressive plan he refers to is pushing Del Monte's earnings to 2 1/2 times the rate of inflation, or just over 12 percent profitability. Del Monte will also aim for a 15 percent return on net operating assets after taxes before 1990.

But while the food industry is today perhaps in its strongest period ever financially, some food companies are going to spend the remaining years of this century trying to manage and pay for huge acquisitions. Not often discussed during the clamor over these acquisitions is that acquiring companies must divert management talent to bringing new companies into the fold. This and the highly competitive nature of the food business will place an even greater strain on profitability but increased profits will be the key to a strong industry in the year 2000.

New ways to make food

The critical role of research and development in America's food future

"Our vision of the company demands we bet on new technologies for the future," says James Ferguson, chairman and CEO of General Foods. Some of the frontiers Ferguson wants GF to explore include taste perception. He hopes GF researchers can find the secret to our taste mechanisms which "could give us a strong competitive advantage." He's also targeting biotechnology as a science to help the company develop new natural colors, flavors, and other additives. Health and nutrition will be the driving force behind research to "keep fats and cholesterol down without losing taste and texture benefits." Another area of concentration will likely be physical rather than chemical preservation systems.

While marketing and advertising have played a key role in the food industry's growth, it's a

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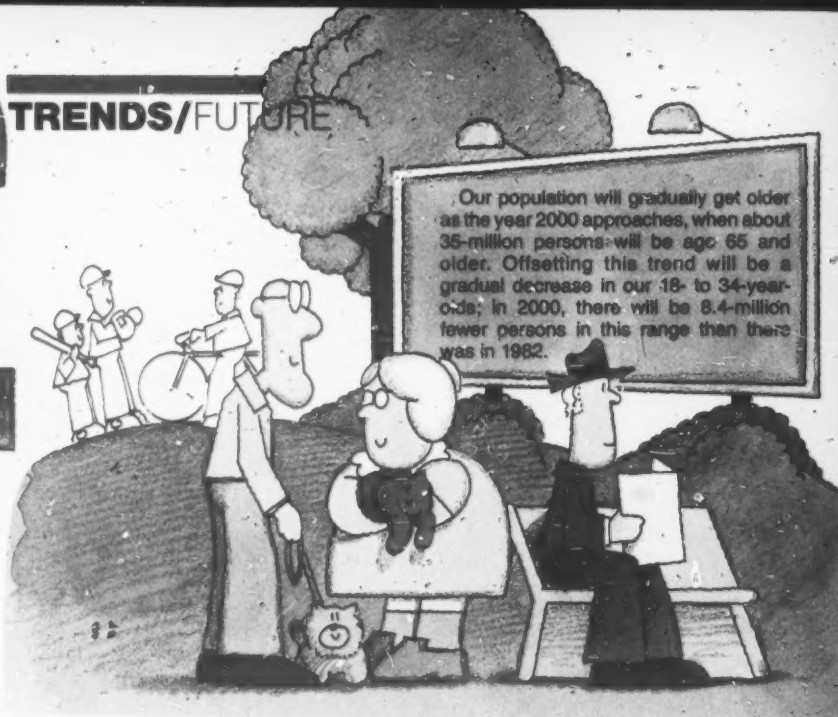
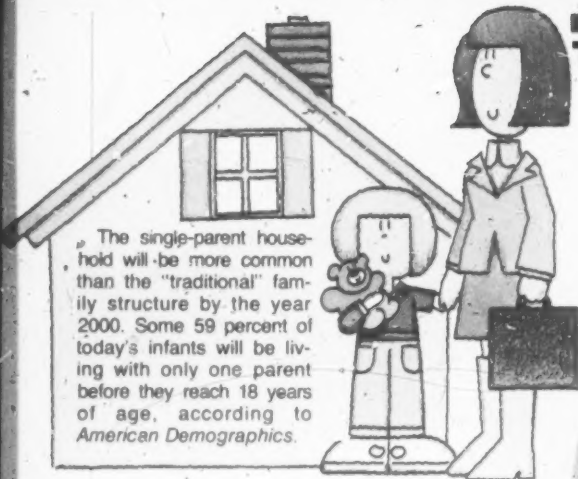
Overall demographic trends show the greatest population increase occurring in the 35- to 54-year-old segment by 2000; the greatest decrease will be in our 18- to 34-year-olds.

PROJECTED DEMOGRAPHIC TRENDS BY AGE

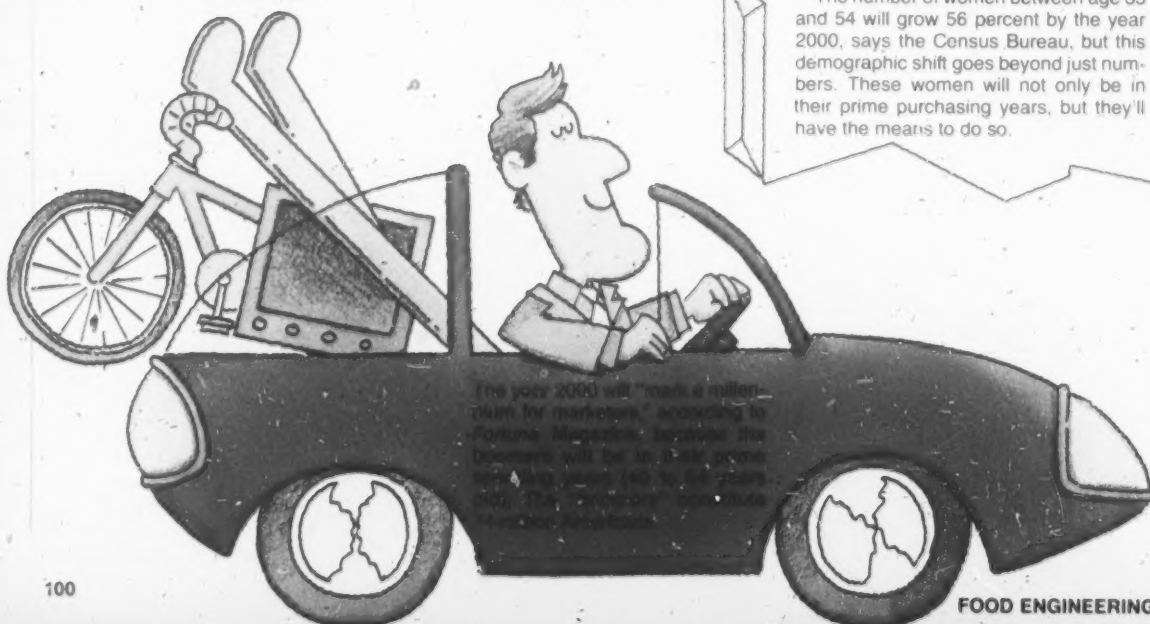
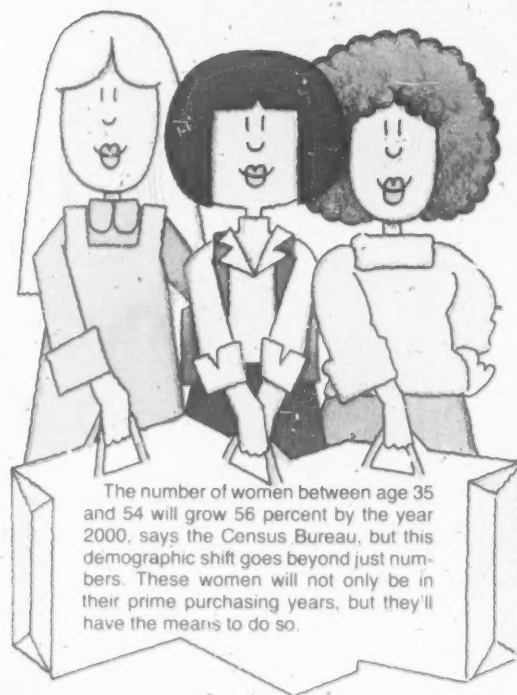
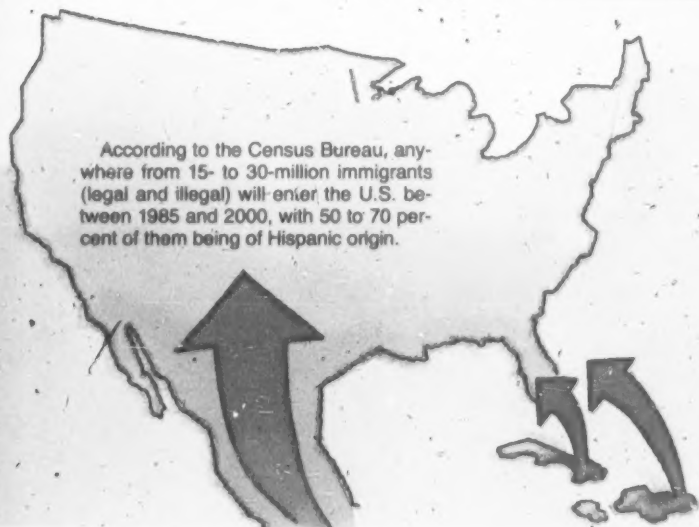
Demographic trends	1982	2000	2010	2030
Number of persons (in thousands and as percent of total)	231,964 (100.0)	266,496 (100.0)	281,732 (100.0)	307,340 (100.0)
Age				
18 to 24 years	29,804 (12.8)	24,882 (9.3)	28,629 (10.1)	28,771 (9.3)
25 to 34 years	39,416 (16.9)	35,783 (13.4)	37,605 (13.3)	38,715 (12.5)
35 to 54 years	51,570 (22.2)	79,177 (29.7)	77,160 (27.3)	77,651 (25.2)
55 years and over	48,334 (20.8)	56,270 (21.1)	69,184 (24.5)	88,100 (28.6)
55 to 64 years	22,141 (9.5)	23,824 (8.9)	33,760 (11.9)	32,236 (10.4)
65 to 74 years	15,756 (6.7)	17,283 (6.4)	19,586 (6.9)	31,561 (10.2)
75 years and over	10,435 (4.4)	15,162 (5.6)	15,837 (5.6)	24,302 (7.9)
Median age (in years)	30.7	35.5	36.6	38.0

SOURCES: BUREAU OF THE CENSUS, AND SOCIAL SECURITY ADMINISTRATION.

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THE WAY WE WILL LIVE



drain on profits and that could place a lot more emphasis on research at some firms. "We'll emphasize making foods in new ways, new products rather than just variations," says Eugene Sullivan, chairman and CEO of Borden. "We'll seek products with distinctive differences the consumer can observe without a lot of marketing and promotion."

One result of the emphasis on research will probably include increased attention to shelf stable processing and packaging systems. The reason: profitability. Perishables cost more—approximately five times the costs compared to shelf-stable products.

But the big question is who will do research in the future? To really make food in new ways, food companies will have to spend more time and money in fundamental or basic research and less on the so-called "black box" techniques of the past, according to Dr. Theodore P. Labuza of the University of Minnesota. "...the industry must turn away from the black-box techniques where X, Y, and Z ingredients are mixed together in a machine at settings A, B, C and you see if it turns out O.K. Product development, if it is to succeed in really making new or improved products, will have to rely more and more on basic research," says Dr. Labuza.

Basic research costs money, lots of it. Will the food companies spend that kind of money on R&D? While some CEOs will direct their companies in that direction, a stronger potential exists that profit-driven food companies will put even more pressure on their suppliers for research work. In an increasing number of cases, the suppliers may become food manufacturers themselves. Back in 1975, for example, food manufacturing ranked last in R&D expenditures per dollar of sales and that pattern has not seriously improved in the last 10 years. Look, too, at patents applicable to food processing. Only 13 per cent of the 2,232 patents in this category from 1963 to 1977 were held by food companies. More than half originated with machinery, sanitation, packaging, instruments firms. One-quarter of the patents were owned by foreign companies and individuals.

In one respect the sheer size of the food industry—an estimated \$300 billion in sales in 1985—guarantees suppliers will be willing to expend research monies in order to create business for themselves. CEOs Ferguson and Sullivan are right about the need to "make food in new ways." In the food industry of tomorrow gaining an edge in the marketplace will often be decided by a unique or uniquely improved product.

If the food companies do not carry their own research load, an opportunity will also exist for more independent food research firms.

"I just don't feel like cooking tonight"

Expect the hardworking baby-boomers to eat out more than any other generation

Male or female, married or unmarried, the above headline will become an even more familiar cry over the next 15 years. Eating away from home consumed 37 percent of the food dollars spent in 1981. By 1990, according to Graham T.T. Molitor, president of Public Policy Forecasting, this figure will have shot up to 50 percent. By the year 2000, a majority of our food dollars may be spent on food prepared away from home. In many American households that's true already.

Increasingly the foodservice market will become the principal market for many food processing companies. Foodservice operations will grow to depend more on food companies to supply packaged, convenient-to-prepare foods.

What could slow the foodservice juggernaut over the next 15 years, however, is the same tool that helped them become famous for fast preparation and service—the microwave oven. It is estimated that half the households in the United States now have a microwave oven and sales continue strong. That phenomenon alone has helped propel premium frozen dinners into the \$400 million market range.

(Continued on next page)

Will "undernutrition" take hold?

Caloric per capita daily intake is on the decline. In the early 1900's, caloric per capita daily intake stood at 3,500 calories; now, it ranges between 3,300 and 3,400. And it's expected to decline to around 3,000 by the year 2000.

People are eating less, and will continue to do so. They may be consuming even smaller amounts than forecasts show, if the theory of "undernutrition" takes hold.

"The 90-year old man of the future will have the physical vigor of a 50-year-old man of today," said gerontologist Roy L. Walford in an interview with *The Futurist*. Walford and his colleagues at the University of California Medical Center in Los Angeles say they may have discovered the key to maximizing life spans, and minimizing the aging process. The key is undernutrition.

Undernutrition is actually a very low-calorie diet rich in vitamins and minerals, or in other words, "undernutrition without malnutrition." Experiments in the laboratory have proven successful. Mice with a life expectancy of about two years have lived beyond four years and maintained their youthfulness on the diet.

Why? Probably because eating less slightly lowers body temperature, says Walford, and lowered body temperature tends to increase lifespan.

Whether the theory will be proven successful in humans is yet to be seen. But industry and researchers do agree on this: Dietary restrictions—such as this and 'anti-cancer' diets—will become much more a part of the common consumer's everyday eating habits by the year 2000.

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GAZING INTO THE FUTURE...

Flavoring foods: From an art to a science

Dr. Morley R. Kare
Director
Monell Chemical
Senses Center

The discovery of saccharin, aspartame, cyclamate and other food flavors were all accidents. By the 21st century, progress on the mechanism of the taste receptors will have progressed to the point where we will be able to predict sensory quality from the chemical structure of the stimulus. Flavoring in food will move from largely an art to more of a science.

We have passed through an era of heightened emphasis on toxicity in food and food additives. Food companies in the coming century will focus on the physiological benefits of the sensory quality of a food. Our knowledge of how a food influences ingestion, digestion and metabolism will be paramount. Foods will be designed with a view to how they relate to hunger, appetite, satiety and obesity.

The marketing department of food companies will include scientists. Genetic diversity of a population in terms of flavor perception and ethnic and environmental determinants of preference will be part of the data considered by these departments. Immunologic surveys will be used to project potential markets for a defined processed food.

At least some progress will have been made to understand how the brain processes sensory quality of food. This may lead to a search for how food affects human behavior and how mood influences preferences.

Heading toward a safer food supply

Dr. Theodore P. Labuza
University of Minnesota
Dept. of Food Science

The years between now and the turn of the century will be interesting for the food industry. It will be a time in which, because of acquisitions and combined R&D departments, the industry must turn away from the black box techniques of product development (where X, Y, Z ingredients are processed in a machine at settings A, B, C and you see if what comes out is good).

Product development, if it is to succeed in really making new or improved products, will have to rely more and more on basic research. For example, every snack food and cereal company wants a crisp texture in at least one of their products, but until we understand what causes crispiness at the molecular level it will be back to the black box technique.

Those that start to think in basics will be the leaders with the others being me-too producers. This basic research is not the panacea to all new products, however. Evaluation of consumers' views shows that the best is fresh; thus, I see several major changes by the year 2000.

More and more emphasis will be placed on control and extension of shelf life of fresh foods including meats, fish, fruits and vegetables. This will be through developments of new packaging that accurately control O₂, CO₂ and ethylene. Coupled with this is the potential for a synergistic effect of surface pasteurization with ionizing radiation. If industry can make the case to FDA that food waste will go down and quality will rise with no potential food safety problems, we will have a much greater choice of fresh products.

In addition, a trend toward hydroponics for very high quality fresh salad vegetables will increase. I envision these, however, only around major northern climate cities where industrial waste heat can be tied in to keep energy costs down.

Finally, the "freshness" desire will push supermarkets into the value added business to increase their profits in competition with the fast food chains. The trend will be towards selling ready to serve entrees from ethnic islands (Mexican, Italian, Chinese, etc.) in the supermarket. The foods themselves and the handling will have to take into consideration safety regulations. Thus these supermarkets will be a new outlet for the foodservice industry with products that can deliver both high quality and safety.

One problem will be education of the market personnel and consumers on how to properly handle the food to prevent food poisoning. Architected foods will also be on the increase especially in fast food service where a reduction in quality may be

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overshadowed by the economics of reduction of labor, waste economies, energy and preparation time. Surimi and prefab egg logs are only the tip of the iceberg. As children grow to adults, this exposure to the engineered foods will make them less sensitive to the desire for really "fresh" products. They may not even want it. How many mothers prepare onion rings or french fries from scratch in the home? Thus, the year 2000 will present a greater dichotomy of consumer wishes which will only be satisfied by market segmentation.

One giant step for the flavor industry?

Skip Roskam
Sr. Vice President,
Sales and Marketing
David Michael & Co. Inc.

The flavor industry and its interactive role within the full spectrum of the food and beverage industries will have made a quantum leap forward by the year 2000 if the food industry allows it.

Through continued progress in opening our doors to one another, we can foster an atmosphere that will encourage and accelerate the following changes:

- The flavor industry will be presenting new and improved flavor systems in *finished food products*.

- Flavor "samples" will no longer come in 60cc ambur bottles. They will be delivered in retort pouches, macro-waveable trays, brix packs.

- Our account managers will be MBA's, with a food science discipline. In essence, they will be marketing oriented, technical people with that innate self-motivation and desire to succeed, which is the very cornerstone of the professional sales person.

- We will be able to produce better natural flavors because of advances in instrumentation such as mass spectrometers, HPLC's and NMR's, enabling the creative flavorist to better isolate key constituents present in what Mother Nature produces.

- Computerization will allow flavor companies to catalog and reference raw materials, finished flavors and their applications faster, allowing better, more accurate service.

- As socio-economic conditions change and our world population increases, it is reasonable to assume that certain natural raw materials will become scarce, cost prohibitive or even non-existent. We must be able to predict and solve these problems by creating new and improved natural analogs and/or fully exploring the potential benefits that biotechnology offers us.

The future appears to provide many challenges for the flavor industry. Those who view the challenges as opportunities will be around to enjoy the year 2000 and beyond!

Making better use of today's technologies

Dr. Steven Young
Manager,
Product Applications
Archer-Daniels-Midland Co.
Research Division

Lest we forget, there are only 15 years which to consider. Although significant advances will be made in all areas of food technology, major change will come from implementation of the technologies of the 1980's. The industry will simply make better use of existing technology. The real revolution could occur in dairy and meat product formulation.

- *The Companies.* More emphasis will be placed on the use of existing ingredients, processing and packaging systems. As companies consolidate to take advantage of their individual strengths, new demands on ingredients, package and equipment supplies will be made. New technologies will be acquired and less will be developed "in-house."

- *The Ingredients.* There will be few truly new ingredients. Ingredient development will be expensive (remember, ingredient suppliers will be under the same pressures as their customers). Emphasis will be on ingredient use creativity. New application technologies will develop that allow product development without major ingredient modification. Many application concepts once held dear may no longer be valid.

- *Formulated Foods.* There will be a revolution in product formulation, primarily in the traditionally conservative dairy and meat industries. These industries are ready to explode with new product concepts. Old ideas will change as new foods will be dictated by ingredient availability, established processes and distribution systems, marketing requirements and nutritional guidelines. There should be more flexibility in product formulation which will allow quick response to changing market demands. The following will be major developments: Non-traditional foods, including foods of foreign origin; foods for special dietary needs; foods with specifically demanded

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nutritional characteristics; and new products from old ideas.

Such developments should be mature by the year 2000, as meat and dairy processors allow themselves to be creative and to meet growing market demands. None of the above formulation opportunities should be difficult to adapt to advances in areas such as processing or packaging.

There will be dramatic differences in food in the year 2000. But I believe most of the changes will be in the way food is packaged and delivered. The basic foods we eat—corn, peas, fresh fruit and the like—will remain a part of the American diet. But they could be presented in entirely new forms. Irradiation, the flexi-pouch and new generations of aseptic containers will make this possible.

The food industry has moved from selling the commodity, to selling the partially formulated product, to selling the wholly formulated product. As an example: First came flour, then cake mix, then ready-to-eat cakes. The next step will probably be improved ways of bringing the completed product to consumers.

Quality will be ever more important 15 years from now. This applies both to processed and fresh products. But as far as some of the 'blue-sky' ideas you hear about, I don't believe they will be that significant. The next decade should bring about evolutionary, rather than revolutionary changes.

By the year 2000, there still will be as great a variety of food plants as there are food products—just as there are now. But, there will be significant developments in the more advanced and sophisticated facilities.

The trend setter facilities will be computerized, robotized and "smarter." *Product demands will require that the facility be part of the process rather than a shelter for the process.* The total internal environment of the plant will be pressurized and conditioned. Better trained people will be required to operate these highly automated facilities and the facility will operate more hours per year.

The higher production volumes and more productive hours will demand low maintenance, high durability materials and systems that can take punishment. The facilities will be designed for longer life. Life-cycle as opposed to first costs will rule the selection of materials and systems. Consequently, plants will cost more to build but less to operate and maintain.

The year 2000 facilities will serve a larger geographic area and be located outside of major metropolitan areas in small to medium size cities that "want" the plant to be there. These cities will offer the required support services and cultural amenities, a willing work force, financing assistance and tax incentives.

Continued economic pressure and a desire for a rapid return on investment will continue to maintain the desire to refurbish and recycle existing facilities—especially the utilization of vacant structures in new market areas. The established infrastructure of an existing facility can provide a six to eight month compression of an overall construction project schedule.

Regardless of the type of product produced, the year 2000 plants will move that product in and out of the plant and into the distribution network more efficiently and effectively than today.

New technology is adopted in a 5- to 15-year timeframe by the U.S. food processing industry. The following forecasts are based on currently identified developments.

Food preservation will focus on freshness with the objective of minimizing the effects of heat beyond that needed for proper preparation. Controlled and modified atmosphere packaging will be employed in combination with refrigeration, ionizing radiation and clean room techniques to achieve an extended shelf-life in processed foods.

It is clear that polymers in film, semi-rigid and rigid form will be the standard for all types of food packaging. Techniques for modifying the surface chemistry of plastic packages will obviate current problems of oxygen permeability and flavor scalping.

There will be a continued emphasis on selecting a prudent diet, that is, one high in

Evolutionary changes ahead

Dr. Dee Graham
Director,
Technology Development
Del Monte Corp.

Food plants become highly sophisticated

Bill Sander
Vice President,
Project Management
Hixson Architects/
Engineers

Future foods to focus on freshness

Dietrich Knorr
Daniel F. Ferkas
Dept. of Food Science
and Human Nutrition
University of Delaware

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complex carbohydrates and low in fat with modest amounts of animal protein. The chemistry of dietary fiber will have undergone a revolution similar to the developments in protein isolates and concentrates seen in the 1960's and 1970's. To this end extensive knowledge will be available on the effect of the chemical structure of a gum, hemicellulose or cellulose polymer on the nutritional value of the fiber isolate. This will lead to fiber isolates designed for specific nutritional affects such as cholesterol reduction and glucose absorption control.

Foods packaged in polymers will carry their own freshness indicators in the form of microchip sensors built into the package. Detectors will sense changes over storage time and indicate the quality status of the food.

The U.S. food processing industry will draw raw materials from outside the U.S. in even greater amounts. Feed stocks will be procured from primary overseas suppliers in semi-processed form as concentrates, bulk aseptic, irradiated and controlled atmosphere packs. High value flavors, colors and other function ingredients produced by tissue culture and fermentation will start to be available.

Convenience will be all-important

Herbert M. Baum
Vice President, Marketing
Campbell Soup Company

Foods will be minimally processed. Foods that have big chunk ingredients will be aseptically processed—retaining crisp, firm texture. Aroma encapsulation will be a major technology drive as aroma becomes more critical to food enjoyment. People will be eating more with their eyes (appearance) and noses (aroma), and sensory attributes will become more important.

Microwave ovens will be in 70-80 percent of the homes. Most convenience foods will come in plastic, table-ready disposable packages for no-pot cooking, with no clean-up. Cooking in a microwave will be the case rather than the exception; convenience will be all important.

Regular sit-down meals will become rarer. Hand-held, on-the-go, portable foods (single serving) will increase in importance.

By the year 2000, ingredients and packaging materials will be delivered more frequently allowing for "just-in-time" manufacturing; i.e. manufacturing to order — greatly reducing manufacturer and food store inventories (and associated carrying costs).

Fermentation technology takes charge

Dr. William L. Brown
President
ABC Research

Future food products will be developed to take advantage of fermentation technology. Two developments in recent years will be responsible for increased activity in using microorganisms in food processing. The energy shortage and cost of refrigeration make shelf-stable products attractive. The progress in biotechnology and our ability to transfer genetic material in microbes gives us the opportunity to produce new flavors, enzymes and stabilize compounds.

Microorganisms can be used as processing aids in bakeries, dairies and meat plants to produce traditional products and many new products.

Fermented snack foods made from a combination of bread, meat and cheese offer the unique advantage of good nutritional value and the convenience of eating "on the go." Finger foods also offer the opportunity to use microwave preparation and offer limited clean-up labor.

The development of flavors by fermentation has a solid foundation in oriental food products, i.e., soy sauce, miso, etc. A number of products are under development to produce fermented ethnic foods, with unique flavors.

Fermented vegetables fit in with our new lifestyle and a number of new products are being developed with vegetables.

Microorganisms will be added to food products to reduce the nitrite level in meat products and maintain safety against *Clostridium botulinum*. Lactic acid producing microbes will do this job and reduce nitrosamines at the same time.

The use of microorganisms to compete with pathogenic organisms will continue to be tested in the research laboratory and offers a means to control a number of the emerging pathogens, i.e., *Campylobacter*, *Yersinia* and Enteropathogenic *E. Coli*.

The future is indeed bright for the use of microorganisms in food processing and preservation.

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Nutritious, upscale foods more popular

Charles J. Carey
President,
National Food
Processors Assn.

• *Products.* Heightened consumer interest in the relationship between diet and health will make the development of nutritious, quality products the number one priority for food producers and processors. With an adequate supply of agricultural products and growing concern over obesity, the emphasis will be on quality and not quantity in food production and packaging. Advances in genetics and hydroponics will assure a consistent supply of the highest quality raw materials. Together with further developments in fish farming and the widespread use of global sourcing, a ready supply of food varieties formerly regarded as exotic will be assured. America's economic prosperity means that tomorrow's consumers will direct more attention and money to food, and that eating will continue to be seen as a pleasant, socially-desirable pastime. As a result, products will be colorful, featuring more tasty, high quality ingredients combined in new and creative ways.

• *Processing.* Traditional processes such as those employed in canning will be improved and used on a wider variety of products, and these thermally processed products will boast an ever higher nutrient count. Improvements to other processes, such as aseptic processing or irradiation, will allow greater use of these emerging technologies. For instance, aseptic packaging of products containing particulates is imminent, while anticipated regulatory approval of food irradiation will permit this technique to be used to sterilize packages or prolong the shelf life of some raw agricultural products.

Industry's most important changes ahead

James E. Hall
Group Vice President
Prepared Foods Group
Geo. A. Hormel & Co.

Computer technology in the year 2000 will provide food manufacturers the ability to develop regional or localized brands, to go after the segmented or niche marketing opportunities that will exist at the turn of the century. Just as self-service created mass marketing opportunities for national brands, in-store scanning and warehouse scanning will allow national manufacturers to direct their emphasis against an ever increasing consumer market segmentation. There will be no typical shopper, i.e. husband, wife, two kids and a dog. ?

Incomes will be greater as the increased earnings of an aging population come into play. Two income earners per family will be an American standard. There will be a need for smaller unitized servings to fulfill the needs of the ever increasing singles market, as well as an aging population.

The growth of Hispanics and other minority groups will increase demand for specialized products. Higher average income for all segments of the population will increase the expectation, in fact the insistence, of quality, superior to our current standards in processed foods. The packaging and the processing techniques will provide products nearer to "homemade" or closer to "fresh." It will necessitate the sourcing of raw materials and ingredients from wherever they are available, throughout the world, to fulfill the demand for unique and pleasant flavors—"A touch of Gourmet." Consumer expectations of quality will increase significantly as new packages and distribution systems are developed to deliver food in a "fresher" state.

The microwave oven will be as common to every home as a television set in the '80's. Prepackaged foods will be cooked in the microwave rather than just reheated. The quality and convenience of microwave cooking will become a way of life.

There will be continued emphasis on weight control, body toning, total physical fitness. Foods with specific nutritional values will be in ever increased demand. Elements in the food supply that "slow" the aging process will be popular. Examples are dairy foods high in calcium, foods fortified by vitamin E for tissue anti-oxidant purposes, foods with anti-carcinogenic attributes such as broccoli, cabbage, etc. and meat with its anti-mutagenic factors. These theories, of course, still require further scientific substantiation.

Ethnic foods will be more and more popular. People want more natural foods, closer to what they prepare at home. Aseptic processing could well provide the quality consumers are going to demand from processed foods. Aseptic filling machines for particulates will have been proven successful and will be "state of the art." Irradiated foods will have the acceptance that microwaveable foods had in 1985.

High barrier rigid and flexible clear plastic containers will be making further inroads on glass and metal containers. There will be renewed interest in the shelf stable section as new ingredient, packaging and processing techniques are developed.

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to significantly enhance product quality. This transition will be accelerated as energy costs for storage distribution increase substantially. Genetic engineering and technology will continue to grow, enabling us to develop new kinds of food through extended shelf life and through alternative processing techniques.

The years 1985 to 2000 will have witnessed far greater changes in packaging, processing and quality of food ingredients than all the previous years of the 20th Century.

Though the segmentation efforts of marketers make it difficult to predict how food packaging will change in the next few weeks let alone by the year 2000, one thing is certain: Food packaging will be infinitely more varied and interesting than even the most visionary seers can imagine. To get a "sneak preview" at the ways in which packaging will change, we need only take a close look at today's consumer. Several fundamental factors regarding their lifestyles and needs can be expected to continue through the next decade and beyond.

Food growers will work with processors and packagers in a systematic approach towards developing products to fulfill consumer demand. Genetics and the growth in functional attribute crops will result in products ideally suited for particular processes and packages. The package itself will be more at home in the "kitchen of the future" with its microwaves, induction stoves and computer-coordinated convenience. Plastic, aseptic, microwaveable containers for food products including particulates will be commonplace in this kitchen, as will a greater variety of single-service packages. Consumers also will come to expect both refrigerated and non-refrigerated food packages to offer extended shelf life.

Other factors will make food packaging an even more vital concern from a global standpoint. Increased food demand will put additional pressure on our biological resources as regional needs will continue to outpace productive capabilities. Today's famines in Africa are related not only to agricultural failures, but also to the lack of adequate means of food storage and distribution. As genetics bring previously untillable acreage into production, the need for protective packaging systems will become even more crucial. These probably will be mobile systems placed close to the harvest, where they will aseptically preserve natural product qualities. They will likely produce large bulk storage packages for subsequent repackaging or distribution in aseptic form, fill and seal systems.

By the year 2000, man will be venturing into space to mine its mineral into energy resources. Satellite workstations will become permanent settlements with its unique food packaging requirements. This "test market" in space will dramatically demonstrate the importance of convenience and packaging in the food distribution cycle.

While predicting how and what the consumer will want to eat in the year 2000 is difficult—if not impossible—I feel that there are five major trends that will strongly impact on the food industry in the year 2000 and that may continue to be major shaping forces of the industry for years to come.

First, the changes in the traditional family structure that have occurred in recent years will simultaneously create both a greater emphasis on the meal as a "centralizing factor" in family life, and a greater need for single-serving products. As family lifestyles become more harried, often with each family member on a different schedule, a meal occasion will become more important as the one time in the day when all family members come together. As a result, consumers will continue to want standard-sized packages with family-oriented portions. Simultaneously, however, family members will have a need for single or dual-serving packages for the times when their differing schedules simply do not allow them to sit down to a meal together. Parents will also want microwave products because they allow their children to make their own meals—safely—and it also gives them more time to spend with their families.

Second, the food market will continue to be *segmented* into separate groups with clearly defined needs. For example, the children of the recent baby boom will want soda, cookies, cold cereals, and other "kid-oriented" products; dieters will want

(Continued on next page)

Space-age packaging technology

James J. Fridl
General Manager, Marketing
Food Packaging Division
Continental Can Company

To come: Five major market changes

Dr. A. Elizabeth Sloan
Director, The Good House-
keeping Institute

TRENDS/FUTURE FOOD

packaged low-calorie meals and "lite" foods and drinks and people with medical problems will want foods specifically developed for their conditions.

Third, the major factor influencing food purchases will be a strong consumer interest in product freshness. Freshness will continue to appear at the top of the list of consumer concerns, even before price or nutrition. As a result, new technologies and new ingredients that will help food products imitate or achieve a fresher flavor, truer color, or more "natural" state will be widely used.

A fourth trend is that Americans will have become more accepting of new technologies as a result of their higher educational levels, greater exposure to technology in general, and more conservative outlooks. This is not to say that chemicals will be accepted again, but that technologies that replace additives—such as food irradiation, aseptic processing, and new types of packaging—will be accepted. Of course, rigorous sanitary, health, and disease-prevention standards will be imposed on all new technologies.

Finally, the interest in nutrition, healthful eating, and fitness will have become a permanent part of the American lifestyle. Consumers will continue to want products with a health or nutrition advantage, especially those that have reduced calories, sodium, or sugar. Nutrition information will appear on virtually all products, but it will take a new form, such as symbols or grades, rather than the complex numerical labels we see today.

Research function: Top priority

A.S. Clausi
Vice President,
General Foods Corp.
Director,
Technical Research

In my view, the research function in the food industry will assume ever-increasing importance during the remainder of the 20th Century and beyond.

Anyone who attends industry conferences and symposia—or reads the technical trade press, such as *Food Engineering*—cannot help but be impressed by the diversity and promise of new areas of attention. New techniques of packaging and preservation, and even entirely new food crops, have captured the imagination of the entire industry. These areas and others will give food scientists new tools to provide new products that consumers want. They can even help us to feed the world.

Developing and applying food technology will become more and more important—to compete effectively we must be able to move, and move quickly. Of course, competition is nothing new in the food industry. Now, however, the stakes are higher than ever before.

Research management will have a continuing responsibility to alert line management about technological opportunities—and also about the specter of obsolescence.

As an industry, we have a lot of catching up to do. Many of America's food production facilities are obsolete. Revitalization is a must, as in other sectors of the economy.

We in the U.S. have been preeminent in food technology. Will we fall behind? The research function will play a vital role in meeting that challenge as we enter the 21st Century.

2000 A.D.: A day in the life of a consumer

Laurel Aittler
Vice Chairman
Leber, Katz Partners
Advertising

She wakes up in the morning. Pressed for time, she drinks her breakfast in the form of a vitamin fortified yogurt fruit blend. She tosses an aseptic "VF" (vegetable/fruit juice blend) in her briefcase for a mid-morning pick-me-up. For lunch, she runs to the newest computerized vending machine, pushes a few buttons, and concocts her own "liquid salad" and a sparkling blend of berry and citrus juices (A little of this . . . a little of that!). She dashes off to her health club where she quenches her thirst with a personalized "activity drink" uniquely formulated for her individual needs. She meets her client for mid-afternoon conferences where flavored mineral water is served along with decaffeinated coffee. That evening, she joins her date for dinner. They "wet their appetite" with an aperitif. With dinner, she orders "lite" wine; he selects a low-alcohol beer. And in place of dessert, she orders Irish cream while he sips an Irish coffee. For a nightcap, she ends the evening with a cup of herbal tea.

2000 A.D. is today.

Some beverages are meals you drink. Juices sparkle. Soft drinks are softer. Foods are so soft you can drink them. Alcohol is blended with food (lite yogurt and ice cream). Coffee and tea are no longer addictive. Water is flavored. Energy drinks move

(Continued on page 120)

TRENDS/FUTURE FOOD

from the health club to the office. More beverages become portable.

Today, alert marketers steal their way through barriers that traditionally defined categories. Old categories like coffee and milk are trending down. New categories are emerging. The action is in the niches between categories. New beverages:

- will be even better for you (replacing the vitamins and minerals that you need).
- will provide more pleasure—they will be irresistibly delicious and indulgent.
- will keep pace with you vis-a-vis packaging that's more convenient, more portable, that will warm or chill your drink whichever way you desire it.
- will help you keep the pace—serving as complete meal replacements that you can sip standing up . . . on the run.

Overall, the beverage industry's future is filled with opportunities. These are just some predictions. By keeping a constant and watchful eye on the environment, this volatile and dynamic industry will probably produce new products down the road that none of us has even dreamed of.

Seafood: Protein of the future?

Krys Holmes
Alaska Fisheries Development
Foundation, Inc.

Protein will be the commodity of the future.

As farmland becomes more and more expensive to work, and as feed costs rise and the productive sector of the economy loses ground to the service sector, beef, poultry and pork proteins will become more expensive. Food processors will seek new sources of low-cost, efficient proteins; and they will have to look to the sea to find them.

Experts predict that seafood consumption will rise from 3.05 billion pounds this year to about 4 billion pounds in the year 2000. That figure doesn't include surimi-based blended seafoods, which have just come into their own in the last five years, and are expected by some to reach annual consumption levels of 1 billion pounds by 1990.

Seafood will ride the tide toward light, nutritious, digestible foods. As the population grows older and amasses more discretionary income, consumers will demand more upscale, sophisticated food dishes; and those premium seafood products like lobster, crab and scallops may be more popular. At the same time, seafood proteins will be available to the lower-middle class consumer in new forms.

In order to respond to the increasing desire for seafood protein, the seafood industry will have to provide a wider variety of products, all attractive to the public. It is known that consumers don't like fish because of its odor, bones and because they just don't know how to prepare it. Two-thirds of all Americans eat seafood only in restaurants.

A wider variety of convenient, attractive seafood products could court and win the heart of the turn-of-the-century consumer. If the U.S. seafood industry is not prepared to meet these needs in the year 2000, it is likely that the Japanese industry will be poised to seize the opportunity, as they did in our automobile and steel industries.

In the future, the attributes of seafood will be available in other forms and useable in other products.

Surimi technology, which is now just beginning in this country, will make available fish proteins and nutrients in literally hundreds of value-added products for the first time. Fish meat processed into surimi has a frozen shelf life of one year; unwashed mince deteriorates in 30-40 days. Surimi-processed fish can be used in a number of prepared dishes, as well as formed into blended seafoods and other products, and this will open up new opportunities for nutritious seafood.

Imagine fat-free surimi-based bacon bits on your salad. Imagine a protein-enriched Godiva chocolate or a no-carbohydrate whipped topping. Imagine a nutritious snack that your teenagers will reach for or a candy for children that's loaded with nutrients.

Surimi makes underutilized fish species available to food processors in ways more useful and more economically beneficial than ever before. Fish that have traditionally been considered "trash fish" could be processed into value-added products, bringing more profits to the producer and more protein to the consumer.

Surimi technology is now on its way to opening up other uses for sea proteins, such as in snacks, as fillers or binders, and even in products such as facial creams, cosmetics and pharmaceuticals.

In addition to developing new uses for fish and surimi in the American diet, food processors in the next 15 years may begin looking to other marine resources for nutrients to use.

**Chilton's
food**

JUNE 1985

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In this issue:
FOOD PACKAGING

Engineering

HOW COMPUTERS ARE RESHAPING THE INDUSTRY

SEE OUR SPECIAL
SURVEY INSIDE



ALSO IN THIS ISSUE:
U.S. SURIMI VENTURE
SALMONELLA CONTROVERSY

Chilton's Food Engineering



ABOUT THE COVER

How extensive is computer use in the food industry? Food Engineering surveyed over 200 plants to find out.

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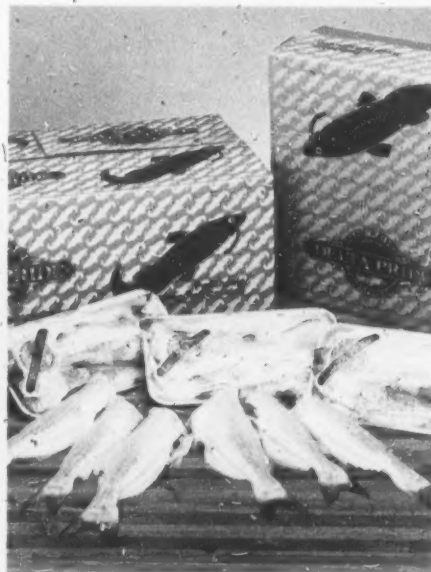
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Special Emphasis

HANDLING & DISTRIBUTION:

Special focus is given to Handling equipment in this month's new product section.

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In April, *Food Engineering* probed the food industry's thoughts on computers. We surveyed 220 food companies, asking detailed questions on how they use computers, how would they like to use computers, what kinds of computers would they buy, and so on. As far as we can determine, this is, to date, the most thorough assessment of the future for computers in the food and beverage industries.

We found an industry that has accepted the idea that computers will play a dominate role in the way it produces food products.

One particular survey typifies how food companies are changing. It was completed by a food technologist working for a small fruit processor. He didn't answer many questions, so all we know about his company is everything is done by hand and there are no plans to change.

We also know his is the stereotypical food plant. It doesn't automate, it hires more people. It doesn't need a computer, just a clerk with a dozen sharp pencils. Yet even in this environment he thought it necessary to write a single, terse sentence: "Our company is behind the times."

The food industry is like our food technologist. It knows it has some catching up to do. And it's turning to computers for help.

But also like our food technologist, the industry knows change doesn't happen overnight. From the survey we know computerization is moving at a carefully measured pace.

We also know why. Companies are not automating just for the sake of automation. They are waiting for intrepid people to find justifiable applications. Computers are accepted by the industry, but they are not reshaping it. People like our observant technologist are.

Survey result: Everyone uses computers

According to the survey, an overwhelming majority of food plants now have computers.

Of the 220 people who returned the survey, 92.3% said they use some form of computer, be it a personal computer, programmable controller, "smart" lab instrument, or process controller. Only 16 said they did not. (A computer, as defined in the survey, is anything with a microprocessor).

The survey pointed out other trends as well. Food companies are spending money on computers. Asked, "How much will your company spend on computers this year?" 33% said over \$100,000. Seventeen percent said \$50,000 to \$100,000.

Food companies want to be more automated. To the question, "On a 1-10 scale, 1 meaning hand labor, 10 meaning robot, how automated are you?" the average reply was 4.7. To the question, "How automated should you be?" the

average reply was 7.2. Only one person answered that his or her company was too automated.

People are satisfied with their computer's performance. Eighty-eight percent said computers have performed up to expectations or better. Only 12% replied that computers have performed inconsistently. Only two said computers were disastrous.

People perceive the food industry as becoming computerized. Asked, "What percentage of food plants use computers?" most people replied 41-60%. The next largest response was 61-80%. Few people replied 0-20%, and those that did tend to be less computerized themselves.

Why now?

We interviewed several survey respondents by phone to confirm these results. From the interviews, we know food companies have computers, but they are only starting to learn what computers can do. Like the *Cheshire Cat*, the stereotypical food plant is disappearing, but it will take time to fade completely.

Why is it fading at all? Why after years of clinging to tried-and-true methods are notoriously conservative food companies using computers?

From the survey and the interviews, we found two forces at work. One, food company management is starting to face intense competition. Not that competition hasn't been there all along. It's just that food companies have not been under the same market pressure as industries such as electronics or petrochemical.

Witness cookie wars, beer wars, and now the onset of cola wars. Moreover, foreign competitors are coming. A Japanese soup company is rumored to be moving to California. In seafood, the Japanese have already established a "beachhead" with surimi.

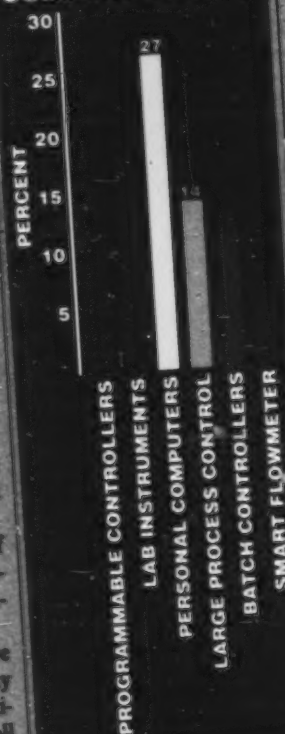
As competition is felt more strongly, food companies will react the same way as other industries. They will try to cut production costs. Computers are one way to do that. A mechanical engineer wrote, "I feel the food industry is years behind in computer applications, but that conversion to many computer uses will be necessary to stay competitive."

The other force pushing computers into food plants comes from the electronics industry itself. Manufacturers now have systems for computer novices, at a reasonable cost. The development of a powerful microprocessor is another factor. Programmable controllers were once sophisticated on/off switches. Now, they are approaching the power of a microcomputer.

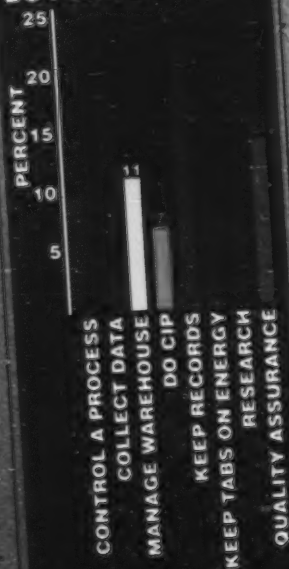
A distinct pattern

The survey and interviews produced a pattern that describes how food plants computer-

WHICH FORM OF COMPUTERS DOES YOUR COMPANY USE?



IN YOUR COMPANY, WHAT DO COMPUTERS DO FOR YOU?



COMPUTERS/EXCLUSIVE SURVEY

ize. See if your company fits the mold.

It's a slow process, taking from one to three years. First installed are one or two programmable controllers or personal computers. Neither has much to do with processing itself: programmable controllers manage a palletizer or freezer, for example. Personal computers end up in offices or labs, sometimes on the plant manager's desk. They keep track of inventory, sales orders, sometimes production statistics, but they don't touch processing itself.

Then people find out these computers can do more. Others are installed. More software is purchased. More responsibilities are delegated, maybe even some small processing tasks. This is where the industry is right now.

Once familiar with computers, a food company is ready for the Big Step. It connects its programmable controllers together with some form of display terminal, maybe a personal computer or a large process control system.

What kind of computers do food plants use?

According to the survey, most companies are not interested in full-blown process control. The survey asked, "What kinds of computers do you use?" The two largest responses were *personal computers* (27%), and *programmable controllers* (25%). Next came *lab instruments* (18%), *large process control systems* (14%), *batch controllers* (12%) and *smart flowmeters* (5%). Two people wrote that they were using mainframe computers.

It's understandable that personal computers and programmable controllers are most widely used. They are relatively inexpensive. They are

also easy to apply. It's far easier to automate a palletizer than an entire packaging line.

Microprocessor developments are partly responsible for lab instruments ranking so high. Five years ago, much was done by hand. The microprocessor has taken on the work of a technician. It also has improved precision. Several people wrote comments similar to this QA manager: "I would like a more automated lab—less room for human error. I would also like to try and use least cost formulation for making the various sausages we do."

Look for even more automation in the lab. A good example of what is ahead is Perkin-Elmer Corp., Norwalk, CT. It introduced a lab system at the Pittsburgh Conference in New Orleans this year. Perkin-Elmer has brought robots and computers together in the lab. Its robots are not industrial grade—they only lift three pounds. But they are not extravagantly priced. The marriage could not be done without a personal computer and special software called PERL—Perkin-Elmer Robot Language. With the robot, sample handling will be completely automated. Test results will go straight to the personal computer for easy reference.

Computers make great clerks

At this point in time, computers are doing paperwork. To the question, "What do computers do for you?" the top two replies were *keep records* (22%) and *collect data* (18%). Fourteen percent replied they use computers for quality control. Other replies, in order, were: *manage the warehouse* (11%), *control an entire process* (10%), *keep tabs on energy* (9%), *assist product research* (8%), and *do CIP* (7%).

A subtle error popped up in this question. There was no "Control part of a process" answer box on the survey. Since there was no box to fill in, we don't know how many people use computers for managing small bits and pieces of a plant. We do know from the phone interviews that the majority of programmable controller are used for that purpose. We also know controllers rarely do process control. Nearly all applications are machine oriented: managing a palletizer, for example.

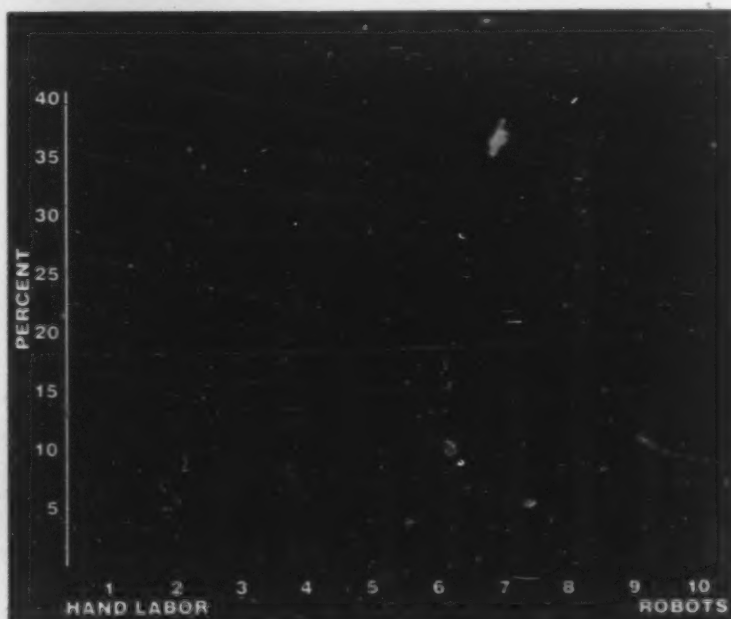
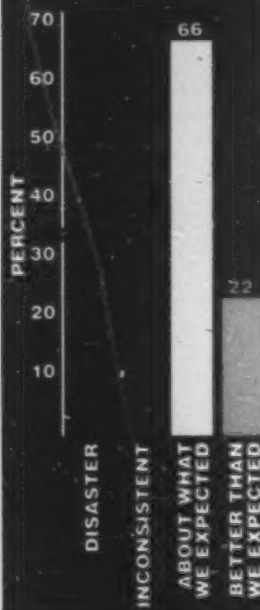
Another result confirmed that computers are managing information, not processing. In reply to, "Why did you install computers?" the most frequently checked answer was *gather data* (28%). Next came *save labor* (26%), *improve product* (17%), *replace old equipment* (12%), and *replace relays* (11%).

The theory that computers tend to be part of renovation projects didn't stand up. Only 6%, or 34 replies, said computers were installed as part of a renovation.

A surprising result was that computers are

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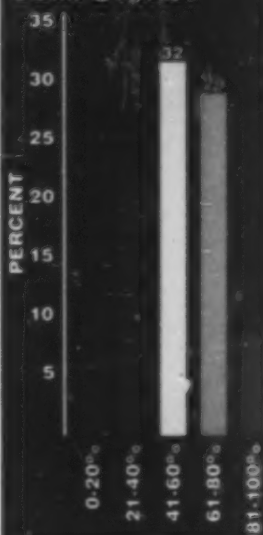
HOW HAVE COMPUTERS PERFORMED FOR YOUR COMPANY?



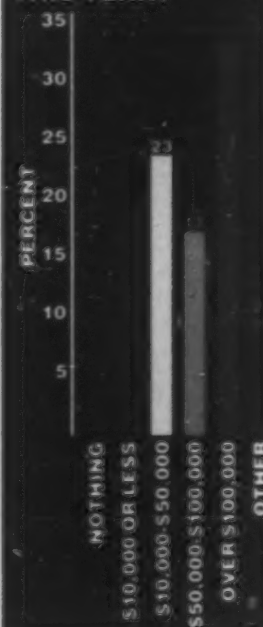
Photos on preceding page is a MYCRO Distributed Control System courtesy of Moore Products Co., Spring House, PA.

Respondents felt better than half of all food plants are computerized. Sixty-one percent estimated that 41-80% of all food plants use computers.

HOW MANY FOOD PLANTS USE COMPUTERS?



HOW MUCH WILL YOUR COMPANY SPEND ON COMPUTERS THIS YEAR?



COMPUTERS/EXCLUSIVE SURVEY

seldom used to replace relays. It turns out that food industry engineers look on computers as more than just relay replacers. Even programmable controllers are regarded as more than just a substitute for relay panels.

Are computers performing well?

To the question, "How have computers performed for your company?", only 13% expressed dissatisfaction. Only one person checked the answer box marked *disaster* and 23 *inconsistent*. Sixty-six percent checked *about what we expected*, while 22% marked *better than expected*.

Several people who checked the "inconsistent" box explained why. Problems stem from the software. A quality control director wrote, "Every system has its down moments. Garbage 'in' has profound effects." One purchasing manager wrote, "Computers have performed better than the people who direct them." A project manager explained, "We are improving with experience. Too many changes are taking place."

How much will be spent?

In a way, how much a company is willing to spend on computers is also a measure of satisfaction. You spend money on what works, or at least what you expect to work.

The largest response came in the highest dollar category. Thirty-three percent said their company was spending over \$100,000 on computers this year. Seventeen percent checked the \$50,000 to \$100,000 category. Twenty-three percent said \$10,000 to \$50,000. Nineteen percent said \$10,000 or less. Only seven percent, 14 answers, said they planned to spend nothing on computers.

There is much room for interpretation. \$100,000 is not a lot of money where computers are concerned. What's more, it can be broken down in dozens of ways. \$100,000 can buy one medium-size process control system, ten small controllers, two "loaded" programmable controllers, a HPLC analyzer for the lab, and so on. What's important is the food industry is going to spend the money.

Common perceptions

The survey contained four questions about computer perceptions. We wanted to know if people feel food companies are becoming more automated, or is the behind-the-times stereotype justified?

Two questions went together. One was "How automated are you?" The other was "How automated do you think you should be?" People rated themselves on a scale from 1-10. A "1" was equivalent to hand labor, while a "10" meant automated to the point of using robots.

People didn't mince numbers. No one skipped the question and only a few gave a range—for example, one engineer wrote "6-8."

In answer to the first question, 64% felt their plant was in the middle of the automation scale. The average was 4.7.

In answering question two, everyone felt their plant should be more automated. The average was 7.2. Only one person felt his or her plant was too automated.

From 4.7 to 7.2 is a big jump, especially for a conservative industry. How people would accomplish this turned out to be an enormous shopping list. A quality control manager wrote, "More CRT's—one for every desktop. A central control tower to weigh out and add ingredients. A computerized version of the Babcock method for fat analysis." A purchasing manager in a sugar company wrote, "Terminals, laboratory robots, and automatic palletizers." A snack food engineer wanted to install an, "On-line data acquisition system to improve product quality."

Perceptions shape opinions

To the question, "How many food plants use computers?" most people answered between 41% and 60%. The next largest response was 61-80% followed by 21-40%. In other words, responses looked like the bell curve with most of the answers right in the middle.

How people perceive their own level of automation influenced how they saw the rest of the industry. That is, if they use a CRT, they believe other people do as well.

People who gave themselves a 1-3 on the automation scale felt 21-40% of all food plants use computers. People in the middle of the scale (4-7) felt 41-60% was a more realistic estimate. People who considered themselves very automated (8-10) felt between 61% and 80% of all food plants use computers.

No matter how people rated themselves, they wanted to be higher. Those on the low end of the automation scale hoped to reach the middle. Those in the middle hoped to reach the high end. Those in the high end wanted to go higher still—7's wanted to become 8's, 8's hoped to become 9's.

But are they helpful?

The survey asked recipients to finish this sentence: "Computers are making today's food plants..." Two replies received 80% of the answers. Forty percent answered *slightly more productive*. Another 40% said *less labor intensive*. No other answer came close.

Only one reply said computers are making the industry worse, not better off. People checked off 286 replies to that question, yet only one felt the food industry is not benefiting from computers. That's a conclusion in itself.



WHAT YOU SAID ABOUT COMPUTERS

In addition to written comments, we talked to survey respondents by phone. Computers certainly elicit lively conversation, not all of it favorable. People did verify most of the survey results. They felt the food industry may not be the most automated or computerized in the U.S., but it isn't on the bottom. And all felt computers are just beginning to influence food processing.

Dave Newhart QA Supervisor

"We use programmable controllers to manage our batching systems. They also keep track of production records. But a more elaborate process control system? I don't think it would work here. We need to be more knowledgeable about our process before we could bring it under computer control.

"We are about as automated as we need to be right now—large process control wouldn't work with the people we employ anyway. It simply isn't justifiable."

I. Aaronson Director of Engineer

"There are a lot of people out there who don't really know what a computer is. They try to do things with computers that aren't practical from a cost standpoint.

"We use a programmable controller on our palletizer. Repeatability and reliability are what I'm interested in. The PC's work just fine in that respect. I can't see the advantage in anything more complicated.

"I think we are like all food plants, in the middle as far as automation goes. The kinds of control we need is basically relay oriented. Sure, we *could* do things with a computer, but we haven't yet, and won't until we need to."

Charles A. Creswell Engineer

"Programmable controllers have been used in several of our new process control schemes. What would be nice is a personal computer network connected to a mainframe computer for data analysis, routine calculations, etc. I wish we could do process analysis—have a statistics package on hand.

"We are getting close to full automation in our new plants, where things are starting at ground zero. Our older plant takes more time, of course. Personally, I think we should use process control wherever appropriate for new lines. Get as close to state-of-the-art as we can."

Brewery Project Engineer (name withheld on request)

"Our plant is well-automated. Our packaging lines were first. Now, we are exploring total automation.

"I think most food companies follow the same pattern. First they automate their packaging lines, then move on to other areas. That's been our experience. Try it on something, if it works, move on."

"My impression is there is a great deal of potential for automation in food plants. In the past computers were not sophisticated enough.

Ed Pawlowski Cad/Cam Supervisor

"I see the food industry not as the leader in automation, but not on the bottom, either. Food companies do not seem to have the same degree of cost-consciousness as other industries. But in the last few years competition has prompted food companies to stop dragging their feet. People see advantages to computers once they are installed.

"Our company is a prime example. We were once set in our ways, but now we're looking at many different kinds of computers. We have some brand-new programmable controllers here that we are experimenting with. And we're also using Cad/Cam systems for engineering work. Computer graphics help in design analysis."

Keith M. Giunta QC Supervisor

"Our freezer is controlled by a programmable controller, but we don't use process control in any shape of form. I think we have a great application for it, though.

"We make cakes. Consumers like a hand-iced look and are willing to pay for it, so we have people on line doing nothing but icing cakes. I would like to develop some kind of mechanical arm or robot that would do the same thing. "I think the way to do it would be to program a computer with icing patterns. The computer would guide the robot so no two cakes look alike. If we could do it before the competition, we would really be in clover.

"I don't see many food companies being computerized. Too many managers think in terms of a one or two year payback. That's all right if you're a monopoly, if you don't have competition. Food companies must look beyond the immediate future if they're to stay profitable."

J. Brent Adair Manager, Project Management

"We purchased a number of personal computers to see what they could do for us. I think the results speak for themselves. Using a 'look back' justification process the investment yielded a ROI of about 200%.

"If I had to purchase something it would be additional CAD (computer aided design)/drafting work stations with color and black three dimensional capability."

Project Engineer (name withheld on request)

"I worked with the latest control methods at a new plant our mother company built recently, and I loved it. Now I'm in one of our least-modern plants. It's torture."

(Continued on next page.)

COMPUTERS/EXCLUSIVE SURVEY

Robots and related equipment to replace people doing menial, boring jobs. This would also increase productivity.

--Project Engineer

Desk Top micro PC—\$25,000. Software—\$5,000. Custom Programming—\$40,000. Programmable Controllers—\$210,000. Remote controlled devices, sensors, and instruments—remainder.

--QC Manager

Process control equipment & recreation facility.

--Process Engineer

A system of personal computers, local area networks, and data highways to allow efficient communication between and within departments.

--Quality Systems Control/ Audit Supervisor

Building restoration and energy conservation methods.

--Plant Manager

A vacation retreat.

--Materials Manager

A data system that would gather laboratory data on various production lots, compare it to specification data and clear product to traffic for shipping.

--Corp. Quality Assurance Manager

Capital still must be spent on a cost/benefit basis and would be applied to most cost effective projects. Our location would definitely look at centralized control using computers to improve labor utilization.

--Technical Manager

Automated packaging equipment, automated processing equipment. If I had anything left over, I would buy an updated personal computer. Mine is too slow.

--Director of Purchasing

Company cars.

--Engineer

\$500,000 is not enough for anything major—most likely some necessary office renovation.

--Purchasing Manager

Knowledge is the most expensive thing a growing company can buy. Our research lab works overtime, spending time and money with the possibility it will come up short. Yet more often than not a major breakthrough means better products, spending reductions, and capital gains. We would love to use computers more



HOW WOULD YOU SPEND \$500,000?

The last question on the survey was, "Suppose you were told your company had \$500,000 left over in its capital budget. You are to spend that sum any way you want, no questions asked. What would you buy?"

People had absolutely no trouble thinking up ways. So many replies came back we couldn't print them all. Here is a selection of the more interesting comments. Since anonymity was promised, names and companies are not listed.

and rely less on guesses.

--Unsigned

1. Replace borderline small equipment (pumps, meters, etc.) with new generation hardware—otherwise, wait until it breaks.

2. For purely QC purposes (non-production), a state-of-the-art, high resolution X-ray inspection system to allow total inspection of all incoming goods, raw materials, and ingredients. It would screen out foreign objects while still in the original sealed container. I could stop 99% of my product complaints and ship material back to the supplier.

--Director of R&D/QC

Distributed control for evaporators and some programmable controllers for relay replacement.

--Mechanical Engineer

MIS type system with an engineering slant. This could monitor process performance, indicate problems early on, and aid in process optimization.

--Instrumentation Engineer

Securities.

--Senior Scientist

1. Upgrade remaining CIP systems with Klenzade MP-1800 systems. 2. Search and destroy all strip chart recorders not using 12-inch wide chart (Honeywell and Foxboro). 3. Cad system for draftsman (no particular system). 4. Expanded word processing (prefer IBM).

--Certification Engineer

Cogeneration and wastewater recycling equipment.

--Unsigned

More programmable controllers to extend our current use of them in selected plant areas.

--Plant manager

Market research study so we know what our customers want in the way of new and modified products. I would spend the rest of the money on R&D and marketing for those new products.

--Quality Manager

High-tech programmable lab analyzers. Personal computers. Modern production equipment with better product protection ability.

--Quality Control Manager

So many possibilities I can't decide.

--Supervisor

(Continued on page 67.)

COMPUTERS/EXCLUSIVE SURVEY

Is there a difference between the use of relatively new personal computers and somewhat older programmable controllers in plant control systems? Absolutely not! In fact, they compliment each other and are proving to be ideal companions in our food plants.

Each has its advantages and each has its drawbacks when used for plant and process control. Fortunately, they tend to fill each other's shortcomings, and can provide very effective solutions to food plant needs. But still, even the combination is not the final solution. The recent survey by Food Engineering helps to point this out.

For example, the survey indicates 80% of all food plants are 12 years or older. This is the lifetime relative to the growth phase computers and control technology have gone through. It highlights the potential for improvement based on better control methods.

The trend has already started. Published data shows the food industry consumed only 7.2% of the total electronic controls and instrumentation sold in the U.S. However, the current growth rate is *twice* the average for such controls. It is clear that the early leaders are moving rapidly to apply advanced automation techniques.

The trend is not limited to only large companies. The survey shows 81% of all food plants have reached a nominal level of automation and they were satisfied with results to date. A scant 1% believed computerization was making plants too complicated. The vast majority, 73%, felt they needed to make a substantial improvement in the area of automation and computers. Two-thirds of the plants report that they are already using programmable controllers and personal computers.

Communication

The low-cost hardware available from the personal computer manufacturer provides an excellent means to enhance the benefits of the programmable controller. The personal computer is capable of communicating with most programmable controllers. Valuable production information goes into a device that is very good at manipulating a lot of data and displaying it on a color CRT in a meaningful way. Whereas a mimic panel is very difficult to change, the CRT can easily be updated to stay current with process operations. This is a big help in training new operators.

Although special software is required for the personal computers to do this, a growing number of companies recently introduced products, and many more will appear in the next year or two. These software packages for the most part, are quite easy to use, and well within the abilities of people working with plant controls.



AN EXPERT VIEW OF WHAT LIES AHEAD

The survey uncovered that food plants like programmable controllers and personal computers more than any other form of computer. We asked Hank Nystrom, Director for the Food and Beverage Industry, Industrial Systems Div., Texas Instruments Inc., to explain why. These are his comments about what we found, and what is coming in the very near future.

In addition to providing a color CRT screen in place of a mimic panel, the personal computer can also send new instructions or commands to a programmable controller. Typically this is done with a special keyboard designed for use in the plant area, rather than the standard keyboard from the supplier.

Personal computers, even the "hardened" versions, are not designed for the same environment as programmable controllers. The disk drives cannot withstand the dust, temperatures, or humidity of a food plant. Although this is a consideration, this should not rule out the use of a personal computer. In most cases, all that need be done is house the personal computer in a suitable enclosure.

The personal computer is beginning to find use as a viable, low-cost method of programming the programmable controller. Although not as rugged as dedicated programmers, the personal computer offers attractive benefits for the engineering office.

First, as software packages become available for major brands of programmable controllers, it is possible to program a variety of types with one piece of hardware. Secondly, when not programming, the personal computer serves a multiple role in the office. This may eliminate the need to purchase a second personal computer that may be used all the time.

Although in some cases the personal computer may not be as easy to use as a specialized programmer with labeled function keys, one will quickly learn how to apply it and the cost advantages will outweigh any minor inconvenience.

A final advantage to using personal computers with a programmable controller is the ability to generate reports from information inside the controller. The user survey reveals 20% of the plants use a programmable controller to help manage information.

As useful as it is, the personal computer is not the answer to all plant needs. Just as the programmable controller needs information, so does the personal computer.

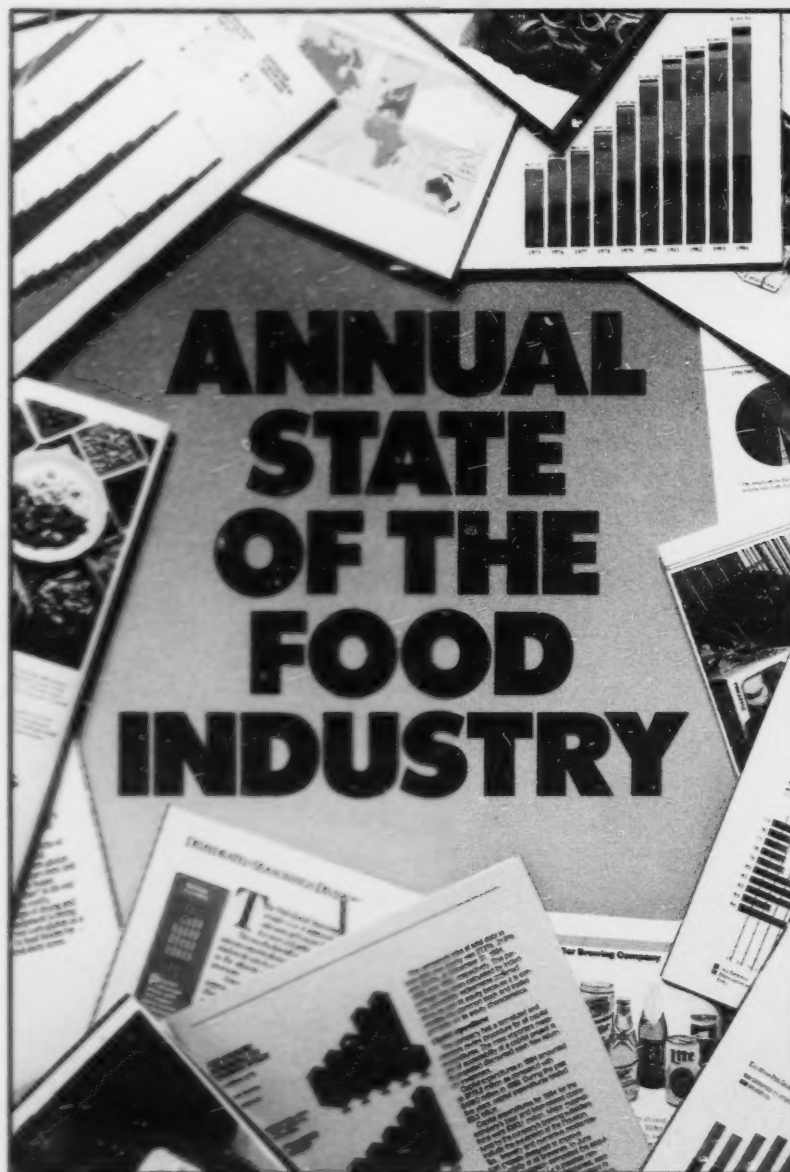
Summary

- Programmable controllers provide the optimum solution to most food plant control needs.
- Personal computers can be used very effectively as operator work stations in place of operator control panels.
- Plant-wide networks are very important to gather information about plant operations and provide a high-level supervisory control system.
- Personal computers can serve as low cost-universal programmers for programmable controllers.

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AUGUST 1985

Chilton's **Food Engineering**

In this issue: **FOOD PACKAGING**



WINNERS, LOSERS, SURVIVORS...

FE's Sixth Annual Report on the food industry. A market-by-market analysis spotlights trends.

INGREDIENT IDEAS

There were plenty of new ideas seen at the recent IFT show. See our editors' round-up of this show.

TROOP FOOD

The military remains the chief focus of retortable pouches, trays.

Chilton's Food Engineering



ABOUT THE COVER

Major acquisitions are still shaping the food industry in 1985. Expect more major consolidations as food giants merge for marketing, distribution advantages.

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News

17 FDA's color rules challenged

Consumer groups and lawmakers are aiming hard at FDA's color additive rules, saying that the agency is too lax in its control.

25 Problems cited at cheese plant

"Leaky" equipment and faulty pasteurization methods turned up at the Jalisco cheese plant. 43 lives have been lost due to ingestion of JaliscoMexican-style cheese.

29 Selecting a new plant site?

While the sun belt is still ranked Number One for its overall manufacturing climate, the central states are quickly closing the gap.

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CONCENTRATED APPLE FIBER: The world's first concentrated low-moisture pure apple fiber was introduced at this year's IFT Show. **PAGE 41**

Features

65 State of the Industry

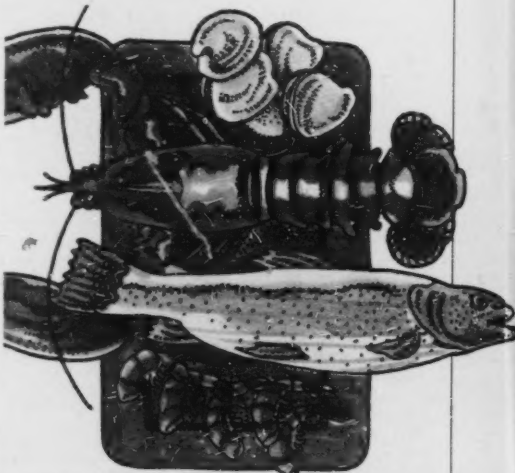
Food Engineering editors outline issues pertinent to the industry as a whole and spot trends and analyze data for thirteen different market segments.

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89 Ingredients Report

A strong international tide swept over the 1985 edition of the IFT Food Expo in Atlanta. FE editors open up their show notebooks with category by category coverage.

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STATE OF THE INDUSTRY: Food Engineering explores thirteen market segments, analyzing the past year's statistics and events and looking ahead to next year. **PAGE 65**

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MRE upgrades products, variety, bigger portions.

54 Coffee Cans

Flexible packages and changes in the coffee market prompt new ideas from metal can manufacturers.

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Alusuisse's composite foil structure for retortable pouches is redesigned for the U.S.

58 Predict Shelf Life

C.M.S.L.P. "knows" a package in Denver needs $\frac{1}{2}$ the moisture barrier of a package in Miami.

60 Composite Can

High moisture barrier structure protects instant baby food while enhancing shelf life.

62 Glass Package

Juice Bowl launches line of single-strength fruit juices and fruit drinks in 10-oz. glass containers.

63 EVOH Barrier Can

Using multi-layer injection blow molding technology, American has produced a high barrier container for several Hormel products.

64 In Memoriam

Bill Simms is gone, but his legacy lives on in the William C. Simms Library at Clemson University.



GLASS PACKAGES: Single-strength fruit juices and juice drinks are being unveiled in a 10-oz. single service Plasti-Shield glass containers. **PAGE 62**

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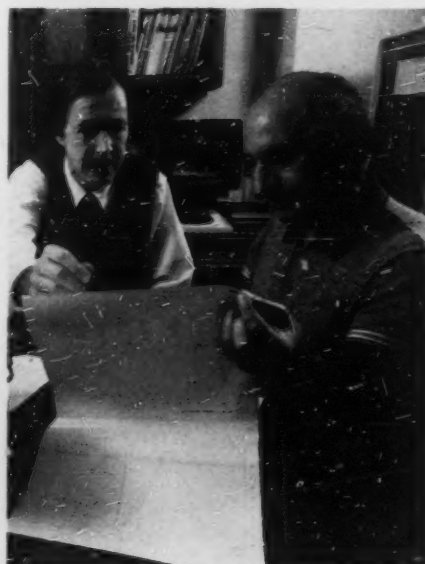
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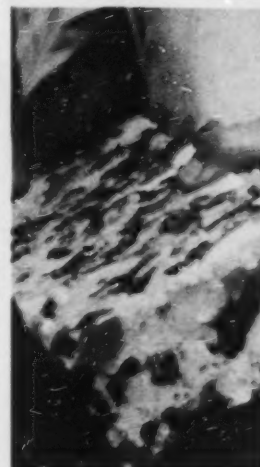
154 FDA hunts meat contaminants

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CHOLESTEROL INHIBITORS: Barley and oats have been found to contain cholesterol inhibitors that may be used to decrease the risk of heart disease. **PAGE 140**



Special Emphasis

PROCESSING EQUIPMENT:

Special focus is given to Processing equipment in this month's new product section.

Pages 103 to 121

NEWS/CORPORATE STRATEGIES

Selecting a new plant site? The central states may offer more

The Sun Belt is still ranked by the experts as Number One for its overall manufacturing climate, but the nation's mid-section is quickly closing the gap. The five-year outlook, they agree, points toward 'central America' as the biggest new plant growth area.

What's wrong with the sun?

The southeast, says Alexander Grant & Company, a management consultant firm, does indeed have much to offer today: A steady economic climate and low unionization.

But wages in the southern states are being driven higher by an influx of high-tech, high-paying jobs and labor short

ages. "A no-holds-barred campaign by organized labor to embrace service and high-tech workers is having an impact on the South's nonunionized image, too," reports Alexander Grant. In comparison to all other states, wages in the southeastern states increased the most last year, according to the firm. (These southeastern states include Florida, Mississippi, Alabama, Georgia, S. Carolina, N. Carolina, Tennessee, Kentucky and Virginia.)

"Sunbelt cities are becoming victims of their own success," agrees John H. Boyd, president of The Boyd Company, location consultants.

"Water shortages cast doubt on future growth for some Sun Belt states, especially Florida, California and Texas," adds a spokesman from *Megatrends* author John Naisbitt's Washington, D.C.-based The

Naisbitt Group. "In other areas, civil and social services are stretched to the breaking point, and government facilities are badly in need of repair if they ever are to accommodate growth."

What the Heartland offers

According to Boyd, the agricultural crisis has prompted heartland states to cast out new manufacturing lures—and increasing costs in the south are helping to reel in new prospects. "Most of the governors in the north central region are attempting to insure future economic stability by broadening the tax base without significantly raising tax levels for businesses and individuals," says Alexander Grant. (The north central region includes Montana, Idaho, Wyoming, N. Dakota, S. Dakota, Nebraska, Kansas, Iowa and Missouri.)

Construction activity, an indicator of

(Continued on next page.)

Comparative Annual Operating Cost Simulation

	Minneapolis Metro Area	Chicago Metro Area	Los Angeles/ Long Beach Metro Area	San Francisco Metro Area	Milwaukee Metro Area	Pittsburgh Metro Area	Philadelphia/ Camden Metro Area	Clay County, Missouri
Nonexempt Labor Weighted Average Hourly Earnings	\$ 7.72	\$ 7.66	\$ 7.96	\$ 9.16	\$ 8.91	\$ 7.96	\$ 7.25	\$ 7.28
Annual Base Payroll Costs (\$1,000)	\$ 4,336	\$ 4,302	\$ 4,471	\$ 5,162	\$ 5,005	\$ 4,471	\$ 4,072	\$ 4,089
Fringe Benefits (\$1,000)	\$ 1,848	\$ 1,835	\$ 1,889	\$ 1,962	\$ 1,932	\$ 1,699	\$ 1,547	\$ 1,564
Total Annual Labor Costs (\$1,000)	\$ 5,984	\$ 5,937	\$ 6,170	\$ 7,124	\$ 6,907	\$ 6,170	\$ 5,619	\$ 5,643
Electric Power Costs (\$1,000)	\$ 267	\$ 315	\$ 362	\$ 336	\$ 283	\$ 258	\$ 342	\$ 244
Natural Gas Costs (\$1,000)	\$ 311	\$ 339	\$ 543	\$ 409	\$ 391	\$ 374	\$ 382	\$ 274
Occupancy Costs (\$1,000)								
Amortization	\$ 1,011	\$ 1,011	\$ 1,094	\$ 1,122	\$ 984	\$ 984	\$ 988	\$ 979
Ad Valorem Taxes	\$ 281	\$ 233	\$ 70	\$ 78	\$ 183	\$ 161	\$ 148	\$ 75
Heating and Air Conditioning	\$ 100	\$ 123	\$ 94	\$ 80	\$ 114	\$ 94	\$ 104	\$ 80
Total Occupancy Costs (\$1,000)	\$ 1,392	\$ 1,367	\$ 1,198	\$ 1,260	\$ 1,291	\$ 1,239	\$ 1,247	\$ 1,136
Total Power and Occupancy Costs (\$1,000)	\$ 1,919	\$ 2,021	\$ 2,103	\$ 2,007	\$ 1,941	\$ 1,871	\$ 1,971	\$ 1,654
Transportation Costs (\$1,000)	\$ 389	\$ 344	\$ 659	\$ 714	\$ 363	\$ 400	\$ 454	\$ 356
Total Annual Geographically-Variable Operating Costs (\$1,000)	\$ 8,283	\$ 8,302	\$ 8,932	\$ 9,845	\$ 9,211	\$ 8,441	\$ 8,044	\$ 7,658

Source: The Boyd Co.

A Boyd location study compared measurable costs of a 295-worker snack food plant making annual shipments of 3.4-million pounds. Overall, the Clay County, Missouri, location proved the most profitable—saving anywhere from \$630,000 to \$2.192-million in operating costs. NOTE: You can receive this entire study free of charge by writing The Boyd Company Location Consultants, 29 Emmons Drive, Princeton, NJ 08540.

(Continued from page 29.)

capital investments and anticipated growth, is up in several key 'heartland' areas. Casper, Wyoming's 1984 construction activity was 24.7 percent above levels reached in 1983. Activity in St. Louis, Missouri was up 12.6 percent; Kansas City, Kansas, up 12.4 percent; Topeka, Kansas, up 7.1 percent; Sioux Falls, South Dakota, up 11.5 percent.

According to Boyd, food processors, in particular, are beginning to focus relocations on the mid-continent region of the U.S. for the following reasons:

- **New products/raw materials availability.** Wheat flour, rice, corn syrups and oats—these are a few of the supplies that can be found right in the back yard of a midwestern food plant.

- **Comparative economics.** Boyd's plant location studies repeatedly show that the central states are becoming economically viable. The company recently compared operating costs for a 295-worker snack food plant in eight metropolitan locations including: Kansas City, Minneapolis, Chicago, Los Angeles, San Francisco, Milwaukee, Pittsburgh and Philadelphia. Annual operating costs projected by Boyd ranged from \$9,845,000 for a San Francisco location to the lowest figure, \$7,653,000, for a Kansas City, Missouri site.

Costs for this study were scaled to a 150,000 square foot processing plant and included such geographically-variable factors as: Payroll, benefits, electric power, natural gas, amortization, property taxes, heating and air conditioning, and transportation. (See chart.)

Other Boyd studies show the central states in a favorable light. "It's definitely a trend," says Boyd. One report comparing annual operating costs (labor, utilities, occupancy, and transportation) of a 300-worker, Fortune 500 firm concluded the following: Houston, Texas, operating costs totaled \$4.572 million; Atlanta, Georgia, \$4.482; Phoenix, Arizona, \$4.388; Philadelphia, Pennsylvania, \$4.368; Kansas City, Missouri, \$4.199.

- **Deregulation of transportation.** For those processors serving national markets, says Boyd, centrally located states offer transportation cost advantages. Shipping prices are becoming a function of geography and not so much a function of interstate commerce, says Boyd.

There's more to it than that

It's important to remember, agree these experts, that quantifiable factors—labor, energy, raw material access, transportation, taxes, population—can be compared from state to state to analyze trends. But other factors, such as quality of life and certain city restrictions, must be studied individually.

Take, for instance, the case of Frito-Lay's snack food plant in Frankfort, Indiana. Before deciding to build there, Frito-Lay management found one major problem with the site: The city couldn't handle the company's waste, which amounted to nearly one-half pound of byproduct per pound of finished product.

Frito-Lay ultimately built the plant in Frankfort and installed its own waste-treatment system—a system that now generates a direct revenue of \$60,000 to \$80,000 per year due to sale of byproducts processed by the system, including process oil, potato and corn solids.

Central Soya to sell food divisions

Central Soya has taken a turn away from its basic strategy of working to offset cyclical commodities profits through diversification. The firm will now emphasize its core commodity and energy and business by selling its branded food divisions.

As part of the new strategy, Central Soya president/CEO and former Beatrice president/CEO Donald P. Eckrich will become chairman and CEO upon retirement of Douglas P. Fleming this month, and Stanley P. Gold—president/CEO of Central Soya's parent Shamrock Holdings, Inc.—will also become president of Central Soya.

The branded food firms up for sale include Centre Brands, Fred's Frozen Foods, J. H. Filbert and Zatarain's. "These sales will be done in an orderly manner to achieve maximum value for these important business segments . . .," said Eckrich. Executives of the branded foods companies will be involved in carrying out this decision, Eckrich added.

Central Soya—like ADM, which recently took over operation of A. E. Staley's former soybean mills (FE March, 85)—trends counter to companies such as Staley and Hormel, who have been reducing commodities operations in favor of "value-added" foods.

ACQUISITIONS SUMMARY

Borden adds strength to its pasta line

Borden, Inc.—distributor of Creamette, Luxury and Ronco pasta—has agreed to acquire Viviano Macaroni Co., a producer of Vimco dry boxed pasta. Viviano, headquartered in Carnegie, Pennsylvania, distributes pasta to foodservice markets in the mid-Atlantic region.

California Coolers to be purchased

Wine coolers—which according to Find/SVP brought in total wholesale revenues of \$111.6-million last year—seems a promising market to Brown-Forman Corp., which has agreed to purchase California Cooler Inc. According to the *San Francisco Chronicle*, the deal will be worth about \$146-million.

Sara Lee to sell potato subsidiary

With annual revenues of \$75-million, Idaho Frozen Foods will be sold by Sara Lee to Universal Foods—if negotiations are successful. Idaho Frozen Foods, says Chairman and CEO of Universal John L. Murray, would provide the firm with its first entry into frozen foods distribution.

Staley Continental to buy foodservice firm

Staley Continental, Inc. has signed a letter of intent to acquire Smelkinson Brothers Corp., a full-line foodservice distributor located in Jessup, Maryland. Smelkinson's 1984 sales were approximately \$100-million.

Bumble Bee buyout

Management of the Bumble Seafoods Division has formed a leveraged buyout of the division from Castle & Cooke, Inc. The new corporation, Bumble Bee Seafoods, Inc., was formed in June, 1985.

STATE OF THE INDUSTRY/OVERVIEW

ACQUISITIONS STILL MOLD THE INDUSTRY

Major acquisitions are still shaping the food industry in 1985. Expect more major consolidations as food giants merge for marketing, distribution advantages.

For awhile it looked like the merger mania that dominated food industry news in 1984 would ease in 1985. Then, just a few months ago, we witnessed the biggest food merger of them all: R.J. Reynolds' acquisition of Nabisco Brands for \$4.9 billion. What these multimillion dollar deals reveal is both an industry at the peak of financial health as well as one engaged in fierce competition for market share. This dichotomy has made conglomeration an important strategic weapon in achieving success in the food industry.

The high cost of developing and positioning new products is the fuel that drives many of these mergers. America's food companies are investing a lot of money in new products. H.J. Heinz is said to have spent \$20 million to put its instant baby food product (shown below in the graphic) in the market. That kind of expenditure is becoming typical for launching a successful new product today.

Another reason mergers have become attractive is they offer the potential for more efficient product distribution. If, for example, a food company acquires a firm selling to the same supermarket or other retail outlets, they both gain an economy of scale. Potentially, they can make use of one sales force instead of two and a common physical distribution system.

Some industry observers, however, see danger in too much consolidation. Although neither for nor against consolidation, The Food Institute described four potential problems in continuing industry consolidation in a booklet entitled "Food and Business Mergers & Acquisitions of 1984". (1) Takeovers

increase concentration and have adverse effects on competition. (2) Tax-motivated takeovers can generate economic losses for the economy. (3) Takeovers have the potential to crowd productive business projects out of capital markets. (4) Takeovers may also create incentives for management to concentrate on short-term performance to the detriment of long-term corporate investment.

Tax reform

If passed reasonably intact, President Reagan's tax reform program should have a favorable impact on many food processors. The chart on the following page, prepared by E.F. Hutton, illustrates how the proposed tax code would affect some of the nation's largest food companies. The food industry is, compared to some of America's other leading industries, heavily taxed with relatively few shelters. The average tax rate for larger food corporations is in the 40-45 percent range. Even with the loss of the investment tax credit, many food companies will see their earnings boosted by 10 percent or more. Among those reaping the largest benefit could be Hershey, Kellogg, Quaker Oats, Gerber and Ralston.

But don't expect to see monies gained through tax reform automatically fall to the bottom line. Because of the increasing competition in the marketing of food products, a large proportion of these gained funds will be channeled into marketing, advertising and other promotion efforts. Also, it should be

(Continued on following page)



New product startup costs are high. Heinz' new instant baby food cost \$20 million to launch. It may cost less to simply acquire an existing line of products or an entire company.

STATE OF THE INDUSTRY/OVERVIEW

(Continued from previous page)

noted, the proposed tax code, if passed this year, does not take effect until 1986.

Market trends

Frozen foods set a hot pace. There's nothing cold or even lukewarm about the pace of frozen food sales over the last five years. From 1980 to 1983 the prepared frozen foods market has experienced vigorous growth. This year that category could well reach \$5 billion in sales with more new products on the way. Still, there's only so much room in supermarket freezer cases. Is a major shakeout coming soon?

I'll drink to that. Maybe the most active new category of all is beverages. Soft drinks replaced water as the nation's number one beverage back in 1983, and the pace of new drink introductions remains brisk.

Within the beverage category, sales have been particularly strong for ready-to-serve fruit beverages. Aseptic packages have played a major role in invigorating this market. Fruit based beverages are said to be a \$7.7 billion category in the U.S. and should grow another 3 percent in 1985.

Are we nearing a pasta war? Although we did not cover it as a separate category in this state-of-the-industry report, pasta is another food category developing lots of momentum. In fact, it's growing so fast it threatens international harmony. President Reagan recently ordered that tariffs on imported pasta be increased sharply in an effort to protect the \$1.3 billion-a-year domestic pasta industry. American manufacturers currently produce 2 billion pounds a year but market penetration,

particularly from Italian manufacturers, has been so swift the National Pasta Association predicts the Italians could gain 20 percent of the American market by 1988 or 1989.

Ethnic food boom. It seems ironic that American food companies would only recently begin to capitalize on the nation's ethnic diversity. Today, a wide range of Japanese, Chinese, Italian and other ethnic-based foods are highly popular in packaged foods. The hottest of these categories is the Hispanic market. In 1980, according to some figures, one out of every 15 Americans was Hispanic—a market of 15 million people and 4 million households. By the year 2000, one out of 10 Americans will be of Hispanic background. New products for this market are continuing strong into 1985.

Health and diet foods surge. These two categories are increasingly merging and appealing, in many cases, to the same customer base, according to some reports. The diet food market, including foods in which calories, fat, sugar and/or sodium contents have been reduced or eliminated, is approximately a \$2 billion market. The \$3 billion market for health foods, those foods free of "artificial additives," continues its expansion from a specialty market to mainstream America.

Coolers jazz up the wine market. The wine cooler, a lightly carbonated mixture of white wine and fruit juice with a 4 to 6 percent alcohol content, could be the most successful new product of the decade. A product area launched by entrepreneurs, they are being joined by majors such as Heublein, Seagram, G. Heileman, Pabst, and Gallo. Shipments of wine coolers have grown from 200,000 gallons in 1982 to approximately 27 million gallons in 1984.

ESTIMATED IMPACT OF TAX REFORM

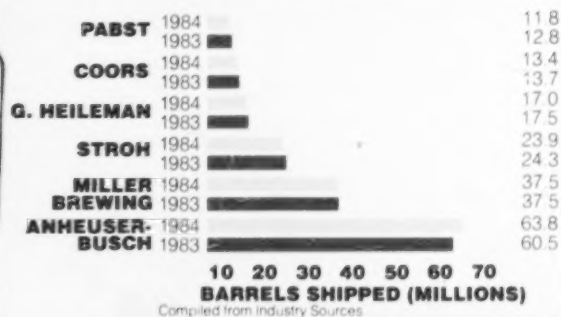
COMPANY	REPORTED (1)				TAX REFORM						
	PRETAX INCOME	TAXES	TAX RATE	NET INCOME	NEW TAX RATE	ADJ. NET INCOME	% CHG	INCR. NET INCOME	PER SHARE	LATEST RPT/EST EARNINGS	ADJUSTED EARNINGS PER SHARE
Beatrice	\$838.0	\$349.0	41.6%	\$479.6	36.5%	\$531.8	+11.0%	\$52.8	\$0.58	\$5.06	\$5.64
Borden	325.1	142.7	43.9	182.4	36.6	206.1	+13.0	23.7	0.46	3.59	4.05
CPC International	329.2	138.2	42.0	191.0	38.9	201.0	+5.2	10.0	0.21	3.98	4.19
Campbell Soup	332.4	141.2	42.5	191.2	35.8	213.4	+11.6	22.2	0.69	5.93	6.62
ConAgra	153.8	61.8	40.2	92.0	35.0	100.0	+8.7	8.0	0.24	2.60	2.84
Dart & Kraft	848.1	392.3	46.3	455.8	38.8	518.8	+13.8	63.0	1.32	9.02	10.34
General Foods	621.4	279.2	44.9	342.2	36.5	394.0	+15.1	51.8	1.09	6.20	7.29
General Mills	398.7	165.3	41.5	233.4	35.6	256.8	+10.0	23.4	0.53	4.89	5.42
Gerber	100.4	44.0	43.8	56.4	35.0	65.3	+15.8	8.9	0.44	2.65	3.09
Heinz	402.2	164.7	40.9	237.5	37.3	252.3	+6.2	14.8	0.22	3.40	3.62
Hershey	209.4	100.7	48.1	108.7	35.0	136.1	+25.2	27.4	0.88	3.47	4.35
Int'l Multifoods	29.3	12.3	42.0	17.0	38.9	17.9	+5.2	0.9	0.11	2.10	2.21
Kellogg	476.1	225.7	47.4	250.4	37.6	297.1	+18.7	46.7	0.76	3.35	4.11
Nabisco	529.0	220.1	41.6	308.9	38.3	326.1	+5.6	17.2	0.30	5.02	5.32
Pillsbury	303.7	133.9	44.1	169.8	36.4	193.2	+13.8	23.4	0.54	4.05	4.59
Quaker Oats	260.1	121.4	46.7	138.7	37.5	162.4	+17.1	23.7	0.58	3.75	4.33
Ralston Purina	437.8	195.1	44.6	242.7	36.2	279.5	+15.2	36.8	0.40	3.60	4.06
Sara Lee	321.5	126.0	39.2	195.5	35.8	206.5	+5.6	11.0	0.20	3.25	3.45
Sysco	81.2	36.1	44.6	45.1	35.0	52.8	+17.1	7.7	0.36	2.14	2.50

(1) Latest year.
Source: E. F. Hutton & Company Inc.

STATE OF THE INDUSTRY/BEER



BEER SHIPMENTS 1984-1983



BEER

Jim Wagner, Senior Editor

Brewers were looking for a change in 1984. Unfortunately they got one. Beer volume, stagnant for two years, dipped two million barrels, the first decline in 28 years.

Of the "big six" only Anheuser-Busch gained ground. It shipped 63.8 million barrels last year, 5.5% more than 1983. A-B now accounts for 35.9% share of the market.

In comparison, second place Miller shipped nearly the same number of barrels—37.521 million in '84 vs. 37.466 million in '83. Miller's share is 21.3%.

The rest experienced heavy downturns. The worst was Pabst. Its volume fell 7.8%, from 12.8 million barrels shipped in '83 to 11.8 million in '84. Even G. Heileman Brewing, which hadn't lost volume in ten years, had a difficult year. Earnings declined 19.6% in spite of record sales of \$1.341 billion. Earnings decreased from \$56,969,000 in 1983 to \$45,798,000 in 1984.

Only two brands were "winners" last year, and both belonged to Anheuser-Busch. *Budweiser* remained the best-selling beer with 24% of the market (44.1 million barrels), a 5% increase in brand growth. The other brand, *Bud Light*, now holds 2.3% of the market (4.2 million barrels), a 10.5% increase in brand growth (figures from *Beverage World*, March, 1985).

A few brands didn't do badly; they simply didn't achieve brand growth. The second most popular beer in America, *Miller Lite*, sold 0.4 million barrels more in 1984 than it did in 1983. And *Stroh's* and *Old Milwaukee* both were up 0.1 million barrels.

The remaining brands took a beating. *Miller High Life* ended 1984 down 3.2 million barrels. Pabst was down 1.6 million barrels. G. Heileman's *Old Style* dropped 0.3 million barrels. *Coors* fell 0.5 million barrels. And *Michelob* was Anheuser-Busch's only "loser" last year, selling 0.3 million barrels less in 1984 than it did in 1983.

There are several reasons why beer sales were off. Imports continued to grow at the expense of domestic beers. In its report, "The American Beer Market," Business Trend Analysts Inc., Commack, NY., points out that while imports represent only a fraction of the total market they are capturing big chunks of new market growth. From 1978 to 1983 U.S. beer consumption grew by 19.5 million barrels. Import volume hit 3 million. That represents more than 15% of the market growth

during that time. According to the report, by 1995 imports will account for 25%.

The market itself is shrinking as well. Social forces such as a higher drinking age in many states and the view of alcohol as unhealthy have eroded sales. In addition, the number of people coming of drinking age is less. In 1982 there were 29.8 million people between 18-24 years old. In 1990 that figure will shrink to 25.1 million. By the year 2000 it will be down to 24.9 million.

All this means intense competition for breweries. Some were forced to tighten down capacity. Despite having the number two and three beers, Miller could not set a date for the opening of its modern Trenton, Ohio, plant built at an estimated cost of \$280 million. Since it could not foresee when the brewery would be needed, it decided to write the asset down to its net realizable value in November. Another example is *Stroh's*, which announced it will close its 135 year-old Detroit brewery, cutting its capacity by 7.2 million barrels.

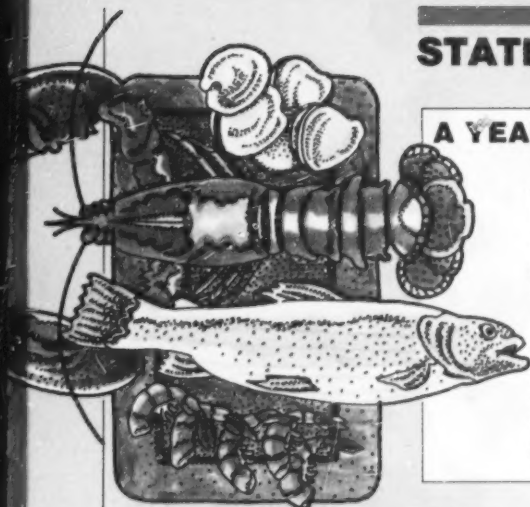
But most breweries are fighting back using marketing as the premier weapon. 1984 saw Miller complete the national roll-out of *Meister Brau* and *Milwaukee's Best*. Miller also introduced *Miller High Life* in a novel 32-ounce can called, appropriately enough, *King Kan*. Miller knows it must bolster *Miller High Life* this year and took steps to do so with an ad campaign in February.

G. Heileman tried to gain market share by acquiring Pabst. It almost succeeded last year, but just when it looked like its \$11 per share tender offer would go through, *Stroh Brewing* and the *Christian Schmidt Brewing Co.* of Philadelphia blocked the acquisition with a preliminary injunction issued by a Federal District Court in Detroit.

Christian Schmidt is especially anxious to stop the purchase. Schmidt must expand to survive, and Pabst would give it access to the midwest. However, the Justice Department has approved the deal, and experts feel it's only a matter of time until Heileman acquires Pabst. Schmidt's fears it will face unbeatable competition in the midwest should that occur.

Breweries looking for a market niche with a future should look toward light beers. According to Business Trends Analysts, Inc., light beers should exceed 33% of all domestic beer consumption by the early 1990's compared to holding about 20% in 1984. That's in spite of the numerous brands already on the market—nearly every premium brand has a light counterpart. But analysts feel light beers will eat into premium sales, not the opposite.

STATE OF THE INDUSTRY/SEAFOOD



A YEAR FOR THE RECORD BOOK

CATEGORY	PREVIOUS RECORD	NEW 1984 RECORD
EDIBLE PRODUCTS	8.4 BILLION POUNDS	8.5 BILLION POUNDS
FILLETS & STEAKS	670.4 MILLION POUNDS	721.7 MILLION POUNDS
SHRIMP	576.8 MILLION POUNDS	610.5 MILLION POUNDS
SHRIMP IMPORTS	341.4 MILLION POUNDS	342.5 MILLION POUNDS
PER CAPITA CONSUMPTION	13.1 POUNDS	13.6 POUNDS
SURIMI IMPORTS	33.1 MILLION POUNDS	70.6 MILLION POUNDS

Source: National Fisheries Institute, AFDF

SEAFOOD

Jim Wagner, Senior Editor

With few exceptions, 1984 was a record year for seafood. The most satisfying statistic: consumption hit an all-time high. Robert Arnold, director of marketing services for the National Fisheries Institute reported per capita seafood consumption reached 13.6 pounds in 1984, half a pound higher than the previous record.

Consumption records were also broken for fillets and steaks, shrimp, shrimp imports, and edible products—domestic production plus imports.

"Seafood marketing has improved, quality is top rate, and availability is better than ever," says Arnold. "It appears consumers are finally comfortable handling seafood. People always knew seafood was good for them, but they weren't sure how to buy it or cook it when they got it home."

Arnold also makes another interesting point. Usually, fresh seafood gains at the expense of frozen. In 1984, both fresh and frozen sales increased. According to the Food Marketing Institute, 42% of sales come from fresh and 58% from frozen.

A few trouble spots

While marketing may be all good news, the processing side had to contend with a few problems. Perhaps most important is the import situation.

Tuna processors were forced to take steps to battle imports which now account for over 20% of the market. Star-Kist (H.J. Heinz) closed its Terminal Island plant in Los Angeles, laying off 1,150 workers. President and CEO Richard Beattie was quoted in the Wall Street Journal as saying the reasons were \$7.50 per hour labor costs compared to \$1.00 per hour in other company facilities. The closure did not affect overall production. Another packer, Ralston Purina, closed its Van Camp Seafood tuna cannery in San Diego for the same reasons. With Ralston it may also be a case of reallocating capacity. The cannery had been running at 40% since 1982, according to a report in the Wall Street Journal (4/12/84).

Tuna canners weren't the only ones with import problems. Shrimp processors had to comply with a FDA regulation last year concerning sulfite levels in imported shrimp. In October, FDA ruled that shrimp with over 40 ppm sulfite content will be allowed into the U.S. only if the sulfite appears on the

ingredient label. Most if not all shrimp coming into the U.S. are treated with sodium bisulfite to combat "black spot." As a result, importers have been scrambling to get the proper labeling for shrimp over FDA's limit. Supplies may tighten in 1985 as a consequence.

Consumption higher than ever

Imports are gravitating to the U.S. because of the rising demand for tuna and shrimp and the high value of the dollar. Per capita canned tuna consumption rose 0.1 pounds to 3.2 pounds annually, continuing a rise that began two years ago. Shrimp hit a record 1.90 pounds, compared to 1.71 pounds in 1983.

"Tuna has always been consistent, with the exception of a dip in 1982," says Arnold. "Shrimp is the 'star' of the seafood industry. Consumption has risen every year for ten years."

Another area that did very well last year and continues to prosper this year is adult-oriented, premium priced seafood like Van De Kamp's *Today's Catch* or Mrs. Paul's gourmet dinners. Van de Kamp estimates the category experienced 38% growth between 1983 and 1984 and now accounts for \$100 million of the \$870 million frozen seafood category.

And another very bright spot was farm-raised seafood. Shrimp is the primary attraction because of high demand. A research report from Texas A&M University placed these values on shrimp farming.

"Revenues from shrimp farming are estimated to be \$2,500 per acre with profit potentials between \$100 and \$400 per crop acre." Dr. Addison Lawrence, marine scientist with the Texas Agricultural Station, says 1,000 acres of water could produce shrimp worth \$2 million.

Two shrimp farms began operating along the South Texas coast and three more were planned. In the near future, Texas could see a \$90 million cultured shrimp business on its shores.

While shrimp is still a *potential* money-maker, catfish farmers saw solid profits last year. According to Delta Catfish Processors of Indianola, Miss., catfish consumption is growing at a compounded rate of 30% a year. Delta reportedly has 35% sales growth and expects to hit \$55,000,000 over 1984-1985.

Lastly, surimi saw more activity last year than ever before. In 1980, about 3.26 million pounds of surimi were imported. In 1984, that figure exploded by a factor of 21.6 to 70.6 million pounds according to the Alaskan Fisheries Development Foundation (AFDF). By 1990, it could reach one billion pounds, according to Judy Hill of Seafood Management Inc.

STATE OF THE INDUSTRY/MILK & DAIRY



MILK AND DAIRY PRODUCTS PER CAPITA CONSUMPTION

	1983	1984	% Change
Whole milk	127.4 lbs	122.7 lbs	-3.7
Lo-fat milk	77.8	80.8	+3.8
Skim milk	11.0	11.9	+8.2
Yogurt	3.2	3.6	+12.5
American cheese	8.9	9.7	+8.9
Ice cream	18.0	17.8	-1.1
Cottage cheese	4.2	4.1	-2.4
Other cheese	9.0	9.5	+5.6
Ice Milk	6.9	6.9	0.00

Source: Milk Industry Foundation

MILK & DAIRY

Jim Wagner, Senior Editor

Last year was characterized by peaks and valleys for the milk and dairy industry. Strong marketing efforts improved cheese and yogurt consumption, and butter-margarine blends were introduced to do the same with butter. But milk supply and demand remains unbalanced, even though the 1983 Dairy Bill worked exactly as planned. And ice cream consumption fell 1.1%, except for premium brands.

Cheese sold very well in 1984. Shipment value of cheese increased over 11%, from \$4,929,000,000 in 1983 to \$5,474,000,000 in 1984 (Predicasts, '72 dollars). Sales of American-type cheeses rose nearly 11% while other types rose 8%.

Yogurt also performed well. On the strength of its "healthy food" image, per capita consumption increased 12.6%, rising from 3.2 pounds in 1983 to 3.6 pounds. Frost & Sullivan estimated that the 1984 yogurt market, worth \$662 million, will blossom into a \$757 million category in four years. Kraft reported 40% sales growth for *Light 'n Lively* lowfat yogurt while Borden had double-digit gains due largely to the introduction of *Weight Watchers*.

Ice cream slumped last year. Per capita consumption shrank from 18.0 pounds in 1983 to 17.8 in 1984. Premium ice cream supported the category. Kraft, for example, reported both tonnage and profit declines in its Dairy Group due in part to the discontinuance of the fluid milk business and lower *Sealtest* ice cream volume. But *Breyers* ice cream was a buoying force, selling strongly in Midwest expansion markets.

Butter rebounded slightly. 1984 shipments were valued at \$745 million compared to \$736 million in 1983 according to Predicasts. But the category is predicted to slip in the future as consumers turn to low-calorie margarine and blends.

Milk still unsettled

For better or for worse, the 1983 Dairy Bill working as designed. On-farm production of fluid milk fell from 139,672,000,000 pounds in 1983 to 135,444,000,000 in 1984 according to the Survey of Current Business. Mid-America Dairymen, perhaps the strongest proponent of the Bill, reported

these other results:

- Government expenditures for dairy price supports were cut in half. Dairy products bought by the Commodity Credit Corp. were down from 16.8 billion pounds milk equivalent in 1983 to 8.6 billion in 1984.

- The farmer-finance diversion program reduced milk production and cut government costs by \$1.2 billion. The milk surplus, which ran 10-12% higher than demand, is now estimated to be around 3% over demand. As of January, 1984, farmers who cut production below base levels were awarded payments of \$10 for each 100 lbs. The program was paid for by a 50¢ per cwt charge on all milk sold.

- A 15¢ per cwt deduction was made from every dairy farmer's milk check starting in May, 1984. About \$195 million was raised for marketing and sales efforts.

The Dairy bill was passed as a way to bring milk supply and demand into balance. These figures show it made inroads. But the Bill is at the end of its 15-month period. Production is edging up again, and the situation may revert to an imbalance by the summer of 1986 according to an industry spokesman, unless consumption increases dramatically.

Which isn't likely. Last year fluid milk consumption gained only 1% overall, and future increases will be about the same. Demand for whole milk products fell while consumption was up for low fat and skim milk. Borden, for example, reported "substantial growth" for its Hi-Protein lowfat milk due to increased sales to calorie-conscious adults.

Butter blends coming

Butter sales have been eroding. In 1983, 1,299,200,000 pounds were produced. That fell to 1,120,100,000 in 1984, according to the Survey of Current Business.

To offset the trend, butter blends have been developed within the last three years. Land O' Lakes was the first with *Country Morning Blend*, which has 40% sweet cream. Stakes are high, as the market for butter blends is estimated to be \$65 million.

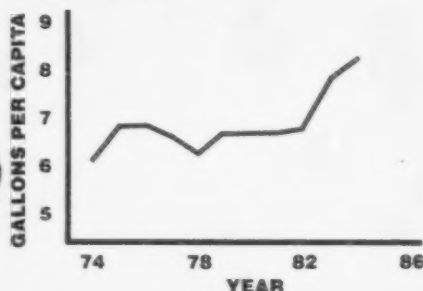
So far, consumers have been reluctant to accept blends. The reason is price—why pay butter prices for a product that's only part butter? As prices drop, however, and marketing picks up, butter blends are expected to do better.

Kraft especially is looking for a blend to catch on. In 1984 it introduced three products into test markets. *Touch of Butter* appeared first followed in fall by *Sheffield Farms Dairy Blend* in the southeast. The latest was *Parkay Plus*, a margarine with 25% cream. It sells for \$1.19, compared to butter at \$1.79.

STATE OF THE INDUSTRY/JUICE



JUICE CONSUMPTION



Based on data from U.S. Commerce Dept., Owens-Illinois

JUICES

Kevin Hannigan, Features Editor

The market for juices continued strong in 1984, with consumption reaching 8.2 gallons per capita—an increase of more than 5% over 1983. “The juice market has seen a rather significant turnaround,” says Owens-Illinois Packaging’s Michael L. Teadt, “due at least in part to consumer concerns for fitness and health.” Teadt also notes the sharp increase in total juice consumption between 1980 and 1984—paralleling the rapid rise of aseptically packaged fruit-juice drinks.

More than a dozen of these aseptically packaged products were introduced in 1984, ranging from traditional orange, grape and apple juices to fruit nectars such as peach, apricot, guava, and pineapple-banana. The increased sales of these “boxed” juices have more than offset declines in canned product, according to *U.S. Industrial Outlook: 1985*. The retail market for single-serve fruit juice drinks in bottles and cans is estimated at about \$280 million, for example, while the market for aseptics is put at more than \$400 million.

Aseptics, juice blends

Aseptic packaging has turned the juice-drink market around, while consumer interest in natural, healthful foods has stimulated new entries in the other juice categories.

Procter & Gamble’s new *Citrus Hill* orange juice, for instance, has lifted that entire category. And Seven-Up’s newly formed Foods Group came up with *JuiceUp*, an exciting 5-item line of frozen lemonade and lemon-limeade concentrates that includes the first “diet” versions of juice concentrates.

At Tree Top Inc., the action is in pure fruit juice blends. In Western states, these blends have grown 312% in the past year. And, of this growth, Tree Top claims about 80%. Its new 100%-juice combinations, reports Dennis J. Collieran, president, offer the consumer pure fruit juice, not just a “drink.”

Others are rushing to market with new blended products, too. Campbell Soup has introduced *Juice Works*—four blended, 100%-juice drinks aimed at mothers with guilt feelings “about giving their kids high-sugar bellywash.” And Nestlé’s Libby, McNeill & Libby Inc. is rolling out a similar product, *Juicy Juice*. Another new item from Coke is *FIVE ALIVE Tropical Citrus Beverage*—a combination of five fruit juices (orange, lemon, pineapple, tangerine and apple).

Packaging changes abound

A grower cooperative oriented to finding uses for surplus crops, Tree Top has literally created the products it sells. “In the early years, it was relatively easy to sell our products because our output was smaller and there wasn’t a lot of competition,” Collieran says, “but our growers are producing more apples now and competition has increased.”

The solution to this problem, Collieran believes, is “to approach the marketplace vigorously and be aggressive in meeting customer needs.” New packaging is part of that plan. Thus, the company unveiled *Apple Juice On Tap*, the first “bag-in-box” fruit juice, in June 1984. And the new blended juices are sold in composite cans. Both the blends and *Tree Top Apple Juice* also are available in 250-ml aseptic packages.

Likewise, Campbell Soup is now selling “V-8” Juice in refrigerated cartons in food stores for the first time. Previously, the product had been marketed only in cans. Marketing Manager Avis Yuni states that, with the refrigerated cartons, “we are now able to provide ‘V-8’ in a package which is preferred by a great number of consumers who would not normally buy it.” Yuni explains that, from 1979 through 1984, refrigerated juice drinks recorded an 89% increase in sales, with the 64-ounce carton being the dominant size. She adds that tests showed refrigerated “V-8” outselling virtually all other chilled carton juices except branded orange juice.

Much of the sales growth for juices during the past 15 years has been in chilled juices sold in glass. “Now,” says O-I’s Teadt, “a number of alternative glass containers are available, including a 1.3-liter package which has been very well received.” Single-serving 8- and 10-ounce juice bottles also are doing very well, due partly to changes in distribution. Juice packers have had great success, for instance, in getting convenience stores to accept the glass package.

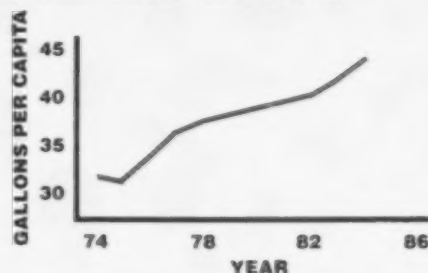
The juice market for aluminum cans is on the verge of rapid expansion, too, according to Reynolds Metals Company. Along with its patented liquid-nitrogen system for non-carbonated beverages, Reynolds has developed an aggressive marketing plan for juice packers. Reportedly, New England Apple already has increased both its retail and vending-machine juice sales using Reynolds’ aluminum cans.

All in all, the outlook for all kinds of juice drinks is very bright. The only dark cloud is a possible tightening of supply as the use of juice in soft drinks and other food products increases. Thus, the market for fruit-juice blends should continue strong.

STATE OF THE INDUSTRY/SOFT DRINKS



SOFT DRINK CONSUMPTION



Based on data from NSDA, U.S. Commerce Dept., Owens-Illinois

SOFT DRINKS

Kevin Hannigan, Features Editor

Americans drank more soft drinks than ever in 1984, averaging about 43.6 gallons per capita according to Department of Commerce figures analyzed by Owens-Illinois' Packaging Operations. That's about 2.1 gallons more per capita than in 1983. All in all, it was a very good year.

Strong consumer demand for diet sodas and greater disposable income contributed to the 1984 record. For the year, the quantity of soft drinks shipped increased by an estimated 5-6%, and the value of shipments reached about \$20 billion, up 8.4% over 1983. Adjusted for inflation, the value of shipments rose more than 5% in 1984. By comparison, industry shipments in constant dollars rose about 1.5% annually during 1980-83.

Profit margins tighter

Soft drink consumption has grown steadily for the past 20 years, says National Soft Drink Association. But all isn't joy on the marketing front. In spite of improving sales and rising volume, profit margins aren't keeping pace. In general, bottlers of high-volume cola brands are faring better than other bottlers.

Cola soft drinks are the dominant market type with 63.2% share; lemon-lime sodas are second with 12.7%; and orange is third with 7.0%. Other citrus flavors hold about 4% of the total market. Now, Pepsi and Coke seem to be going after these latter segments with new and/or improved products.

Seven-Up commands more than 50% of the lemon-lime segment, which grew 7.8% in 1984 compared to a 5.6% increase in cola shipments. Its new competition will come from *Slice*, a citrus-based carbonated soft drink introduced by Pepsi-Cola that contains 10% fruit juice. Coke is testing *Minute Maid Orange Soda* and *Diet Minute Maid Orange Soda*, both with 10% real orange juice. These new products join *Sprite* and *Diet Sprite* (in the lemon-lime segment), *Fresca* (grapefruit-flavor category) and *Mello Yello* (sugar-citrus flavor segment).

Diet drink sales of the major franchise brands (Coca-Cola, Pepsi-Cola, Seven-Up) rose an estimated 18-20% in 1984. But the popularity of aspartame-sweetened diet drinks also provided a major boost for most other bottlers. With demand rising, diet

drinks were about 21.5% of the market in 1984, up from 20% in 1982. And, by mid-year, diet drinks from Procter & Gamble, Shasta, Canfield, and the Squirt Company used only aspartame.

Last November, Pepsi-Cola decided that all of its diet colas would use aspartame in the future. Currently, Pepsi is second in the diet-cola market, but this move to 100% aspartame should heighten competition with *Diet Coke*. Seven-Up also reformulated *Diet 7Up* and *Sugar-Free Like* to use 100% *NutraSweet*.

Move to larger packages

Major changes are occurring in soft drink packaging. During 1978-84, use of plastic containers for soft drinks rose from 7.6% of the total to 22.6%. The metal can's share of a larger market dwindled from 43.8% to 35.7%; while glass container usage dropped from 48.6% to 41.7%. Meanwhile, demand for carbonated beverages in single-serve bottles and cans (16 ounce and less) declined as consumers showed a preference for larger sizes. Between 1978-82, demand for 6- to 9-ounce bottles fell 78%, and dropped 42% for 10- to 12-ounce bottles. Shipments of 16-ounce bottles, though, rose 18%.

Many bottlers moved to add larger, 3-liter (101-ounce) plastic bottles to their product lines in 1984. But grocery retailers expressed concern about the space demands of still another soft drink packaging variation. Since shelf space is limited, retailers may be more selective in the future, and lower-volume brands may be reduced or eliminated.

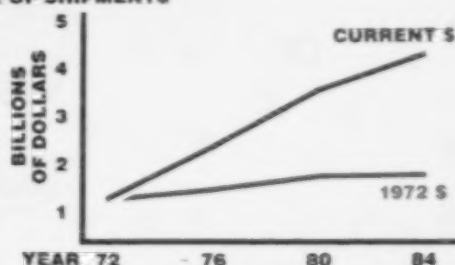
The soft drink industry is using more all-aluminum beverage cans, too, according to recent figures from Reynolds Metals Company. Shipments were up 11.5% through April, and Reynolds expects total aluminum soft drink can shipments to exceed 35 billion units this year. Based on industry sales figures, the total number of aluminum cans in demand for 1985 may reach 70 billion or more. Combined with the industry's given capacity, this more than likely will create a situation in which demand outpaces supply in some regions. That was the case last Summer, and this supply constraint will probably be repeated again in the Summer of 1986.

According to *U.S. Industrial Outlook: 1985*, the carbonated soft drink industry should have another good year in 1985. Value of shipments in constant dollars should increase 5% over the 1984 level. But, for the long term, prospects are mixed. Adjusted for inflation, the value of soft drink industry shipments is forecast to increase 1.8% annually over the next five years. But it's likely that demographic shifts and changing taste patterns will restrain consumer growth.

STATE OF THE INDUSTRY/CEREALS



BREAKFAST CEREALS VALUE OF SHIPMENTS



Based on data from U.S. Dept. of Commerce, Bureau of the Census, Bureau of Economic Analysis.

CEREALS

Kevin Hannigan, Features Editor

In 1984, says *U.S. Industrial Outlook: 1985*, the estimated value of shipments by the cereal breakfast food industry increased to \$4.5 billion in current dollars. Adjusted for inflation, however, the value dropped 1.1%. That fact characterizes the entire market for breakfast cereals, and helps to explain the dynamic marketing war now being waged there.

A changing marketplace

Changing purchasing patterns, moderate food prices, and strengthened disposable income prompted consumers to spend more last year. In the process, heavily advertised brands recovered ground lost during the last recession. But the market share of generic and private-label cereals, never more than 5% of sales, contracted to less than 2%.

In 1984, manufacturers' prices for cold and hot cereals gained only 3.7% and 2.1%, respectively. By comparison, producer prices of all foods increased 4.4%. Meanwhile, costs kept rising. Oats cost 12.6% more in 1984, for instance. And packaging costs rose faster than most ingredient costs. Furthermore, during 1977-82, changing consumer preferences caused firms to alter their ingredients mix. As a result, breakfast cereal companies increased their use of fruit by 15.5% annually.

Changes in taste affected the demand for some cereals. In 1972-77, for example, wheat-based products rose markedly—but corn-based items grew very slowly. Rice cereals fell somewhere between. In 1977-82, however, consumption of corn-based cereals edged up 2.1% a year, while wheat-based products dipped 0.6%. Then, in 1984, it turned around again. Consumption of corn-based items dropped about 3.2%, while wheat-based products advanced 9.7%.

Demographics play an important role, too. Children under age nine make up the fastest-growing segment of the \$4-billion cereal market and should reach 20% of the population by 1990. But the number of children aged 5-14—the major consumers of presweetened cereals—shrank by 0.6% annually between 1979 and 1984. At the same time, the 20-49 age group, important consumers of unsweetened cereals, rose 2.6% yearly.

The result is that convenience, nutrition and parental concerns shape much of today's cereal market. Vitamin fortification, fiber, and bran in cereal are attracting adult consumers.

And, to meet everyone's preference, cereal firms are constantly launching new products. Recent examples include: *Fiber One*, *Bran Muffin Crisp* and *S'Mores Crunch* from General Mills; *OJ's* and *Extra-Fiber All-Bran* from Kellogg's; and *Sun Flakes* aspartame-flavored corn flake cereal from Ralston Purina.

This steady flow of new products constantly changes the face of the market. In 1984, four companies supplied 75% of the total breakfast cereal market—slightly less than in 1983. Kellogg had about 33% of total sales; General Foods took 21%; Quaker Oats held an 11% market share; and General Mills produced 10% of all sales. But Kellogg's campaign for its bran cereals—linking the consumption of fiber to prevention of cancer—reportedly has increased Kellogg's market share by about 4%. At the same time, GF's share may have slipped 2%.

The wave of "character" cereals is still with us. Last year, Kellogg added *C-3PO* cereal, while General Mills introduced *E.T.* and *Pac Man*, GF licensed the *Smurfs* for its *Smurfberry Crunch*, Quaker unveiled its *Mr. T*, and Ralston Purina licensed *Donkey Kong*, *Gremlins* and *Rainbow Brite*. These "character" cereals are usually presweetened. But a switch of sorts was Ralston's introduction of low-sugar *Cabbage Patch Kids* brand cereal. A response to consumer requests, it's the industry's first low-sugar cereal using a licensed property.

Steady growth forecast

A slowly growing population, along with concerns for health and nutrition, suggest very modest gains for grocery products over the next five years. The value of shipments of cereals (in constant dollars) between 1985 and 1990 should rise 0.9% annually, a rate equal to the increase in population. But the number of children aged 5-14 will increase 1.2% yearly. This demographic phenomenon may indicate increased consumption of presweetened cereals. The population segment aged 20-49 will gain 1.3% annually, so cereal companies will probably continue to market cold cereals targeted to the adult market.

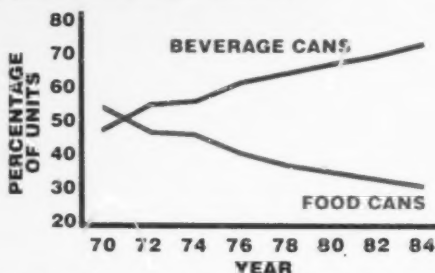
In 1985, shipments by the cereal industry should rise 1.4%, adjusted for inflation. Changes in ingredient prices, especially for fruits, will likely have a greater impact on costs.

In the future, breakfast cereal firms may devote more resources to important markets for hot cereals. Between 1985 and 1990, the population aged 65 years and over will rise 2.1% yearly. Likewise, the population of children five years of age and under will increase 0.8% annually. Both these population groups are large consumers of hot cereal for reasons of taste, texture, nutritional value and lower retail price.

STATE OF THE INDUSTRY/CANNED FOODS



**BEVERAGE CAN vs.
FOOD CAN PRODUCTION**



Source: Can Manufacturers Institute; International Trade Administration

CANNED FOODS

Dianne L. Taylor, Associate Editor

Canned food consumption continues to decline, but certain segments of the market, including Mexican and specialty foods, are showing signs of growth.

Over the past five years, food can production declined at an average rate of 2 percent a year—mostly because of decreasing consumer demand. "Canned food consumption in general," says a Commerce Department spokesman, "will continue to decrease from .5 to 1 percent annually over the next five years."

Greater use of frozen and fresh foods, in combination with a trend toward eating away from home, will fuel the gradual erosion of the canned foods market, sources agree.

Fruits/vegetables

Although the current dollar value of production of canned fruits, vegetables and specialties rose 4.4 percent in 1984 to \$20.9 billion, the value of production declined almost 2 percent after adjustment for inflation.

Per capita consumption of canned fruit, in particular, declined from 29 to 23 percent of total fruit consumption between 1978 and 1983; fresh fruit consumption took up the 6 percent slack and increased to 65 percent of the total market. Says market research firm Business Trend Analysts: "As the trend towards healthy eating continues through the 1980's, canned fruit consumption is expected to stagnate." Del Monte reports the market for canned fruits plummeted even further in 1984—about 4 percent.

Canned vegetable demand followed a similar pattern, with consumption declining about 1.5 percent annually over the last five years. Consumption will continue on the same decline for the next five years, says the Department of Commerce.

Room for optimism

Though even canned food giant Del Monte and can-maker Continental Can are not predicting a return to the high-growth market canned foods once knew, sources agree there is profit potential for certain canned food segments—namely, canned tomato products, specialty foods and low-sodium/light items.

Demand for these foods has increased recently with the onset of pasta popularity, more disposable income and greater health awareness.

Squeezing a profit out of the tight canned foods market, says Continental Food Packaging's General Manager of Sales and Marketing James D. Beam, can be done. Like Del Monte, he says, processors must make the effort to meet changing consumer needs. "I'm not predicting massive growth in canned foods," he admits, "but there are segments ripe for growth if processors update the product *inside* the can to appeal to consumers."

Del Monte, despite the decline of overall canned vegetable consumption, churned up profits in this category last year. The company's \$10-million "No Salt Added" canned vegetable campaign succeeded in carving out a new market within the canned vegetable segment for Del Monte. No Salt Added vegetables now make up 10 percent of the company's U.S. vegetable sales, and the line increased Del Monte's share of the overall canned vegetable market to 23 percent. "Americans are more concerned with nutrition and eating right than they were just a few years ago," says Del Monte's President of the Dry Grocery and Beverage Products Division Fernando Gumucio. "We needed to change the image of our canned products to address these concerns if we were to stay in this business."

Del Monte's Lite Fruits—another variation away from traditional canned fruits packed in heavy syrup—also reeled in sales for the firm. Lite fruits accounted for 19 percent of the company's U.S. canned fruit sales in 1984.

Progresso is another company that has made the can work. Progresso's total soup volume climbed 48 percent in 1983 and is estimated to have grown by the same amount in 1984. The company, a subsidiary of Ogden Corp., has positioned its canned soups as high-quality items and is said to be "obsessed with fresh, quality ingredients."

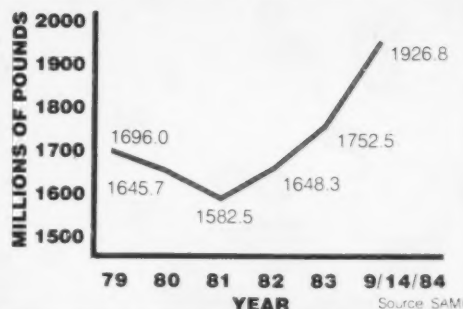
"Unfortunately, the majority of food processors haven't changed their canned foods with the times," says Beam. "And that's the main reason why consumer demand has slackened off so much."

Another segment ripe for growth within the canned foods market: Mexican foods. The Hispanic population—the main consumers of Mexican canned foods—in the U.S. has increased by more than 61 percent over the past decade. And according to the Census Bureau, anywhere from 15- to 30-million immigrants (legal and illegal) will enter the U.S. between 1985 and 2000, with 50 to 70 percent of them being of Hispanic origin.

STATE OF THE INDUSTRY/FROZEN FOODS



FROZEN PREPARED FOODS (tonnage)



FROZEN FOODS

Dianne L. Taylor, Associate Editor

Frozen foods have been showing surprisingly strong growth for a market considered saturated just a few years ago. But the sales rise has not been across the board.

Increasing popularity of gourmet entrees has been responsible for nearly all the growth in the frozen foods market, and Mexican, Oriental and "microwaveable" foods are performing with vigor. On the other end of the spectrum are the frozen fruit, vegetable, and "regular TV dinner" categories—three markets where growth has been particularly weak over the last few years.

Frozen entrees

In 1984, frozen entree sales were up by 9.2 percent over 1983. Premium and/or low-calorie single dishes and complete dinners spurred most of the success.

Premium and/or low-calorie single dishes account for about 37 percent of 1984 retail sales of all frozen single dishes, says Find/SVP. Upscale, complete dinners are expected to capture 52 percent of total frozen complete dinner sales for 1984.

Single dishes, the largest processed frozen food category, showed a retail dollar sales growth of 18.5 percent from 1978 to 1984 (a compound annual rate)—to over \$2.5-billion.

Nationality foods—Mexican and Oriental dishes—have caught on, too, says Find/SVP. Retail volume of frozen Mexican foods for 1984 is estimated at 148-million pounds, valued at \$265-million. Retail poundage of frozen Oriental food has increased at an average annual rate of 33 percent since 1981, while dollar volume has grown by 49 percent. Estimates for 1984 volume value the frozen Oriental category at \$297-million; or 88.9 million pounds.

Hors d'oeuvres sales are forecast by Find/SVP to reach \$390-million by 1990, or four times 1984 sales of \$91-million. Pizza flavored snacks comprise three quarters of current sales.

All sources agree that "microwaveable" foods—like these hors d'oeuvres—will grow in the future. According to Campbell Soup Company, microwave ovens will be in 70 to 80 percent of all homes by the year 2000.

Low growth segments

The dollar value of frozen fruit and vegetable shipments declined about 10 percent in 1984 as compared to 1983—despite stable shipments. Because of unusually high increases in production and energy costs, frozen vegetable processors are introducing brand name combination vegetables with sauces—products that not only focus on consumer demands but command a higher profit margin than traditional vegetables. Many of these items can be used in the microwave and offer a strong brand appeal.

As vegetable processors continue efforts to meet changing consumer tastes throughout the coming decade, predicts Business Trend Analysts, profitability will become the rule rather than the exception.

Says the market research firm: In 1972, 40 percent of all processed vegetables were frozen; today 50 percent are frozen. Shipments, however, have remained stagnant since 1981.

Adds one analyst: "Manufacturers in this category could reverse a declining growth trend."

Frozen fruits account for 9.8 percent of the total fruit market—a figure that has remained stable over the past decade.

Other frozen food categories that have lost ground recently, according to Find/SVP:

- The \$457-million regular TV dinner market. Quickly losing ground to premium and low-calorie entrees, this mature market is expected to decline over the next five years. In 1984, it accounted for about 50 percent of total frozen dinner sales.

- The \$806-million frozen pizza market. This category declined in poundage in 1982 and 1983, and 1984 sales were flat.

- Pot pies, estimated at 1984 retail sales of \$245-million. Pot pies are expected to remain flat for the remainder of the decade, but, says Find/SVP: "There is a very real possibility that the category could be revitalized by the introduction of a premium quality product."

Imports/exports

After two years of declining frozen exports, U.S. exports of frozen foods increased 8.2 percent in 1984 to \$300-million, according to the U.S. Department of Commerce.

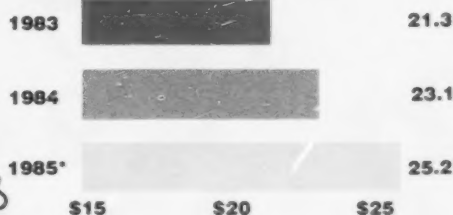
Frozen vegetables accounted for 20 percent of these exports, and frozen potato products made up 17 percent.

Frozen food imports into the United States increased about 46 percent in 1984, but they only accounted for 2 percent of total frozen food consumption in the U.S. Frozen broccoli is our largest import item.

STATE OF THE INDUSTRY/SNACKS



U.S. SNACK FOOD MARKET SALES (IN BILLIONS)



* Estimate
Source: Business Trend Analysts

SNACK FOODS

Dianne L. Taylor, Associate Editor

Sales in the snack food market have tripled over the past decade, and in 1984, the growth trend continued. But the soaring cost of cooking oils, along with increased processing costs, is putting a strain on some processors' profits.

Sales in this category have remained strong thanks to innovative new product introductions and strong marketing and promotion programs. Potato chips, for instance, have grown to a nearly \$2.9-billion market, thanks to new products like thick-cut, low-salt, light and/or newly-flavored items. Frito-Lay spent over \$50-million researching and developing its successful *O'Grady's* thick-cut potato chip line, which was introduced nationally last year and has reeled in over \$100-million in sales since test market introduction in 1983. The chips are also available in flavored varieties.

Some snack food firms have quickly capitalized on microwave oven ownership, adding to the success of this category, says MRCA Information Services. Unpopped, 'microwaveable' popcorn, for one, is "burgeoning," says MRCA.

Granola bars, too, contributed to this segment's success. Though demand is slowing down somewhat, scores of new product introductions pushed sales in the granola category up by 20 percent in 1984 over 1983. Quaker captured 40 percent of the \$350-million granola snack market with the introduction of the first chocolate-dipped granola bars, called *Granola Dips*. Analysts agree that the market is beginning to mature, since sales growth has slackened off since 1983.

'Wholesome' snacks have also contributed to snack foods' success. Fresh fruit consumption has grown, reflecting consumer preferences for fresh, 'good-for-you' foods. Says an MRCA Information Services study: Fresh fruit is consumed an average of 42.6 occasions per year per capita across the country, compared with 50.1 occasions per year per capita for salty snacks, including potato and corn chips, nuts and popcorn.

The trend toward 'wholesome' snacks is evident in the processed snack market, too, says General Mills. General Mills' Fruit Roll-Ups is one of the largest-selling brands in the 'wholesome' snack category, says General Mills, and the prod-

uct posted "strong" volume gains in 1984. The dried fruit market finished 1984 with a 30 percent increase in sales—due mostly to a strong gain in the fruit roll category.

Yogurt has also emerged as a solid market performer, according to Business Trend Analysts (BTA). Per capita unit sales of yogurt have more than doubled in the last decade and now stand at 3.38 pounds. Close to 800-million pounds of yogurt were sold in 1984, and sales have grown at an average annual rate of more than 7.5 percent since 1980. BTA expects per capita unit sales to reach 4.14 pounds by 1994, as total annual domestic production tops the 1-billion pound mark.

According to BTA, the entire \$23.1-billion snack food market (including yogurt, cookies, snack cakes and pies, salty snacks, cheese curls, fruit snacks and frozen snacks) will expand at an average annual rate of 9 percent over the next ten years.

Why such growth? Today's young, upwardly mobile professional market is expanding. Yuppies, said tracker of new products Martin Friedman in a recent article, especially singles under 45 years old, are the biggest snackers and grazers; they snack 30 percent more often than the rest of the population.

Profit strain

Despite snack food growth, many processors are having problems keeping up their profit margins. Borden, manufacturer of *Wise* snacks, *Cottage Fries* potato chips and other snack items, says despite an 11 percent increase over 1983 in its snack segment, "income remained virtually unchanged" due to the "highest costs for cooking oil in ten years." Increased marketing expenditures played a part in Borden's setback, too.

USDA estimates show that the price of soybean oil increased 48 percent in 1984, and prices for all other cooking oils followed a similar pattern. The agency predicts further price increases for all oils in 1985 because demand for soybean cattle meal has decreased along with the decline in beef production. In turn, this has lessened the demand for crushed soybeans—resulting in a smaller cooking oil supply.

Frito-Lay, which dominates 40 percent of the country's salty snack food market, is attempting to absorb this and other cost increases without sacrificing profits. The company has developed an 'increased-solids' potato that yields more finished product per pound of raw material. The installation of more precise weighing and packaging machines at five production facilities, too, has enabled Frito-Lay to increase profits. "The saving from this measure alone is the equivalent of one manufacturing plant's annual capacity," says the firm.



STATE OF THE INDUSTRY/WINE

WINE PER CAPITA CONSUMPTION

YEAR	GALLONS
1975	1.73
1976	1.73
1977	1.82
1978	1.96
1979	1.98
1980	2.12
1981	2.20
1982	2.22
1983	2.26
1984	2.35

WINE

Maria S. Stein, Editorial Assistant

Wine, accustomed to fast-track growth in the 1970s, has found the 1980s a different story. While sales continue to increase — 2.3 percent in 1983, 2.6 percent in 1984 — and per capita consumption is also on the rise, growth is substantially below expectations. In addition, much of the growth in wine can be linked to the phenomenal success of wine coolers.

Imports. In a word, this is the major problem facing American vintners. A strong dollar has made European wines more affordable to U.S. buyers while American wines are more expensive in foreign markets. It is now estimated that European wine has carved out a vigorous 25 percent market share in the United States.

American producers are responding to the import challenge with legislative and promotional tactics. The Wine Equity Act, endorsed by the Wine Institute, calls for equal tariff and non-tariff treatment of American and European wines. Equal wine taxes, it is believed, would allow American wines to better compete with European prices.

California vintners and growers approved a marketing order that established the Wine and Winegrape Improvement Advisory Board. Its goal? To promote California wines by raising consumer awareness and acceptance. Allocations of the board's approximate \$4 million income include \$1.6 million for market development and \$1 million for trade development.

The decreasing gains in wine consumption are another factor spurring price reductions throughout the United States. Between 1982 and 1984 the cost per case of Gallo's Chablis Blanc, Almaden's Mt. White Chablis and Paul Masson's Chablis experienced cuts ranging from \$1-\$3. So far, the price war has been contained to lower-end brands while most producers are relying on their higher-priced, better quality wines to maintain profit margins.

Domestic market trends

Table wines continue to lead with roughly 80% of total domestic wine shipments. The past ten years have seen white wine shipments grow from under 50% to over 63%. The current health and fitness swing has influenced this growth with the consumer perception that white wine is lower in calories and alcohol content. The red wine share has dropped to 21.9%

and the rosé to 14.9%.

The wine cooler — wine, fruit juice, carbonation, and sweeteners — has rapidly captured an impressive 5% of total wine sales. Since its market entrance in 1982, cooler sales have jumped from 200,000 gallons to roughly 27 million gallons in 1984. *California Cooler* was the first of these popular wine beverages. One notable feature of this product was how it broke ground with its distribution through beer wholesalers. This strategic move placed coolers in the beer and soda drinker market. With a 4-7 percent alcohol content, the cooler is attractive to wine drinkers opting for less sophisticated wines and lower alcohol contents.

Entries into the wine cooler market are increasing at a tremendous pace. As producers with large marketing and advertising budgets launch their coolers, competition will intensify. 1985 will lead to an inevitable shakeout. Currently boasting more than half of the cooler market, *California Cooler* is likely to remain prominent next year — with Gallo, Seagram, Heublein, Canandaigua, and the Wine Group emerging as contenders. With a predicted average growth rate of 13.5% annually, shipments for 1993 are estimated at 83.5 million gallons, according to Business Trend Analysts.

Effervescent success

Sparkling wines are also causing a stir in the industry with an average annual increase of 9.5%. Effervescent wines have become more accessible to the consumer as prices have dropped into a range comparable with other wines. The time has passed when consumption of these wines was restricted to special occasions. Champagne provides the wine drinker with an interesting alternative to table wine. Gallo is the leading producer of sparkling wine with its popular *Andre* brand. Other producers who have realized success in this market include Almaden Vineyards, Franzia Brothers, ISC Wines of California, F. Korbel, Weibel Champagne Vineyards, Canandaigua, Monarch and Taylor.

Some forecasters believe higher consumption of wines, including more expansive vintages, will be linked closely to the 25 to 44 age group. By 1992 this market is projected to consist of almost 83 million people. Combined, these figures would seem to precipitate promising market growth. But, it is also predicted that European imports will grow at unprecedented speed, possibly swelling to over 33% of total U.S. wine sales by 1993. Effervescent wines and wine coolers will continue to exhibit the most growth in the domestic market.

STATE OF THE INDUSTRY/BAKERY



COOKIES AND CRACKERS

VALUE OF SHIPMENTS (in millions of dollars)

1982		4665
1983		4822
1984		5276

Source: U.S. Department of Commerce, Bureau of the Census, Bureau of Economic Analysis, and International Trade Administration (ITA). Estimates and forecasts by ITA.

BAKERY

William C. Drennan, Senior Editor

In 1984, industry performance varied among the different segments of the bakery products group. Shipments of white pan bread continued to decline, while shipments of variety breads continued to grow. Shipments of white bread-type rolls increased, and sales of sweet goods recovered appreciably from a decline during the 1981-82 recession. Cookie shipments expanded significantly, and sales of crackers rose even faster.

Cookies rise sharply

Significant changes occurred in the cookie market in 1984. From 1978-83, the industry registered a 1.3% yearly growth in the value of shipments, adjusted for inflation. In 1984, constant dollar shipments jumped 5.7%. During the 5-year span, shipments of cookie products rose 1.7% annually. In 1984, they increased to an estimated \$2.9 billion (current dollar), a constant dollar advance of 2.6%.

Between 1978 and 1983, poundage of cookie production dropped 2.2% a year. In 1984, however, output of cookies gained an estimated 5.7% to 1.8 billion pounds. These production trends reflect per capita consumption. From 1978 to 1983, per capita consumption of cookies declined 3.6% annually. In 1984, however, estimated consumption of cookies soared 4.8%, to 7.7 pounds per capita.

Introduction of new products, vigorous competition among cookie makers, and changing consumer preferences contributed to the gain for cookies in 1984. Until 1982, most packaged cookies had a crumbly texture. Softer cookies were only available in specialized outlets and retail bakeries. In 1982, Frito Lay, the snack food division of PepsiCo, began to market a soft cookie. Frito Lay uses an extensive route system to deliver its products to supermarkets, and its initial success attracted other food companies. In 1983, Proctor and Gamble introduced a soft cookie with a solid circumference and chewy center. These characteristics, made possible by the use of corn syrup as a sweetener, appealed to adults as well as children.

As these soft cookies succeeded, established firms responded to these new rivals. Nabisco, the industry leader, launched a new line of soft cookies and reformulated existing products. The company also intensified advertising and promotion efforts. Keebler also brought out soft cookies. Of the four major cookie-

producing companies, only American Brands has yet to enter the soft cookie market.

The price of wheat flour, which represents almost 51% of the total value of agricultural commodities used by the bakery products group, remained essentially unchanged in 1984. Prices of flour-based mixes and doughs, which are about 4.3% of total ingredient costs, increased slightly but stayed well below the weighted average increase of 4.1% for all ingredients.

The price of nonfat dry milk actually declined, while the price of refined sugar, which constitutes about 11.0% of total ingredient cost, edged up 2.0%.

Producer prices of other ingredients rose sharply. Prices of corn syrup jumped 11.6%; lard, more than 30.0%; 100-percent vegetable shortening, 44.2%; and processed eggs, which provide 2.0% of edible inputs, had a price increase of 40.2%.

Prices of packaging material climbed more than most major commodity prices. Paperboard prices gained 7.4%, while prices of cellophane were up 5.2%. Other plastic packaging prices increased only 2.1%. Prices of laminated paper climbed 3.2%.

The value of imported bakery goods has consistently exceeded the value of exports. In 1984, total imports reached \$198.5 million, with cookies and crackers providing 85.5% of the total. To avoid problems of exporting into the United States, and to penetrate the U.S. mass market, foreign firms have located in the U.S. United Biscuit Ltd. of the U.K. owns Keebler Biscuit. Biscuit General of France owns Burry Biscuit Co. George Weston Ltd. of Canada owns Interbake. In 1984, foreign-owned enterprises generated about 1.8% of U.S. sales of bread and similar items and 20.7% of cookie and cracker sales.

Changes in industry structure

During 1984, two significant acquisitions occurred in the bakery products industries. Ralston Purina Company agreed to purchase Continental Baking from ITT for \$475 million. Previously, Ralston Purina held a 1.5% share of the cookie and cracker market. Continental Grain sold its western division of Oroweat Food Inc., for \$60 million to General Foods, owner of Entenmann's Inc. With a 0.9% market share, Entenmann's ranked 16th in the bread and similar products industry.

In 1985, bakery industry shipments should gain 2.7% in constant dollars. Among the various segments of the industry, growth is estimated to range from 2.1% for the bread and related products industry to more than double that, 4.5%, for the cookie and cracker industry. Steady labor costs and moderate price increases for ingredients will help both industries.

STATE OF THE INDUSTRY/MEAT



U.S. PER CAPITA MEAT CONSUMPTION (IN POUNDS)

Year	Red meat ¹			Total	All meat	
	Beef	Pork	Other ²		Poultry ³	Products
1977	91.7	55.8	4.7	152.2	53.2	205.4
1978	87.2	55.9	3.8	146.9	55.9	202.8
1979	78.1	63.8	3.0	144.9	60.5	205.4
1980	76.5	68.3	2.8	147.6	60.6	208.2
1981	77.1	65.0	3.0	145.1	62.4	207.5
1982	77.2	59.0	3.1	139.3	63.8	203.1
1983	78.7	62.2	3.1	144.0	65.0	209.0
1984	77.4	60.6	3.2	141.2	65.6	206.8

¹Retail cut equivalent

²Lamb, veal, and mutton

³Ready-to-cut

Source: U.S. Department of Agriculture

MEAT

William C. Drennan, Senior Editor

Consumption of red meat products was down in 1984, after a slight rise in 1983. Red meat consumption has declined almost steadily since 1977, because of changes in meat prices, erratic supplies and consumer concern about health. About three-fourths of all meat consumed in 1977 was red meat, but by 1984 the share had dropped to 68%. Beef production was 23.6 billion pounds in 1984, with a decrease of 3% projected for 1985. Pork production declined to 14.8 billion pounds, with a further decrease of 1½% projected for 1985.

Poultry production, on the other hand, was up in 1984 to 16.0 billion pounds. Demand for poultry products has been very strong in recent years. New products, such as boneless chicken breasts, chicken hot dogs, finger-sized poultry products and chicken entrees have gained wide acceptance. As a result, per capita consumption of poultry has risen from 53 pounds in 1977 to an expected 68 pounds in 1985. Some projections have per capita poultry consumption surpassing beef by 1990.

Herd sizes for cattle have been declining for three straight years, reflecting, according to Jens Knutson, economist for the American Meat Institute, bad economic conditions on the farm. Knutson feels that the farm debt load is such that even if meat prices rise due to demand, bankers may still refrain from lending. Knutson believes that this will prevent herd expansion until farmers become more financially stable. Needing to generate more dollars, farmers will emphasize herd marketing, rather than herd expansion.

Poultry farms at capacity

Poultry farms, however, are operating at or near capacity. The demand is so great, according to Bill Roenigk, economist with the National Broiler Council, that there is not enough housing or hatchery capacity to meet it. Roenigk projects a 5% increase in production in 1985, and another 4-5% increase in '86. Roenigk finds that cycles in the poultry industry are becoming longer, with less pronounced peaks and valleys. He believes this is due to the steady demand large food manufacturing companies are placing on poultry products, tempering ups and downs in the marketplace.

Employment in the red meat industry remained unchanged in 1984 at 197,200 workers. A few major companies closed

packing facilities, but other plants that had been closed were reopened under different management. The renegotiating of labor contracts reduced average hourly earnings to \$8.19 in 1984 from \$8.61 in 1983. Employment in the poultry industry totaled 125,600 workers, an increase of 4.2% over 1983. To increase productivity, larger and more automated facilities are being built. Capital expenditures for new plants and equipment rose from \$58 million in 1972 to \$237 million in 1984.

In 1983, the top four meat packing firms accounted for over 25% of total sales within the industry. These firms were IBP, Armour & Co., EXCEL, and Oscar Mayer. On the other hand, the top four firms in the meat processing industry accounted for less than 15% of meat processing sales. These firms included United Brands, Consolidated Foods, Beatrice Companies, and General Foods. The top four poultry firms account for almost 20% of total industry sales. These include Gold Kist, Continental Grain's poultry division, Holly Farms of the Federal Co., and Cargill's poultry division.

U.S. is a net importer of red meat

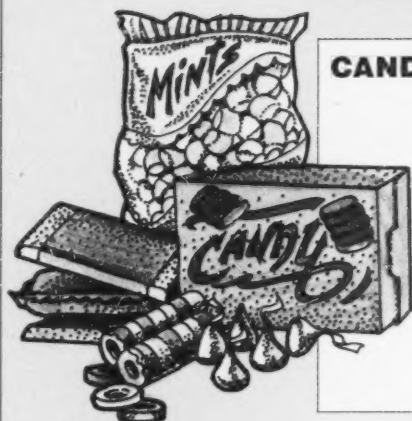
Although the United States is the world's major producer of red meat, it remained a net importer in 1984, importing over one million metric tons and exporting 250,000 metric tons. A significant portion of U.S. exports are cattlehides.

However, for the first time in recent history, the value of red meat exports (including cattlehides) in 1984 was greater than the value of imports. The value of U.S. exports increased 14% to \$2.0 billion. Exports of hides totaled more than \$1 billion, while exports of beef increased 10%, to about \$670 million. Meanwhile, value of meat imports declined 13% to \$1.9 billion. Imports from Australia and New Zealand, which account for almost half of U.S. imports were off 30%.

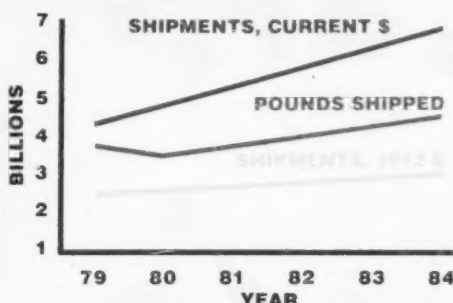
U.S. imports of poultry and related products rose to an estimated \$25 million in 1984, a 62% increase over 1983. Imports still account for less than 0.2% of domestic consumption. U.S. exports of poultry products account for less than 2% of 1984 production.

The U.S. Industrial Outlook expects industry shipments of red meat, measured in constant 1972 dollars, are expected to decline almost 2% in 1985. For the second year in a row, livestock prices are expected to increase between 3% and 7% in 1985. Meanwhile, the poultry industry will continue to see real growth in 1985. The value of shipments by the poultry and related products industry, measured in constant 1972 dollars, is expected to increase 3.9% in 1985.

STATE OF THE INDUSTRY/CANDY



CANDY SHIPMENTS



Source: Bureau of the Census and International Trade Administration

CANDY

William C. Drennan, Senior Editor

Candy demand increased in 1984. With improved economic conditions in 1984, U.S. consumers purchased about 4.3 billion pounds of candy, an increase of about 4% from 1983 levels. Demand for U.S. candy rose about 3.1%, while consumption of imported candy, which represents about 5% of total candy, rose about 15%. Between 1980 and 1984, total candy consumption increased at an annual rate of almost 5%.

The value of all candy shipments was almost \$6.4 billion in 1984. Adjusted for inflation, the value of chocolate and nonchocolate candy shipments increased by 2.4%. In 1984, per capita consumption of chocolate and nonchocolate candy reached an estimated 18.2 lbs. — an increase of 3%. Per capita consumption of chocolate candy alone increased about 4.5%.

Targeting a new audience

The industry has improved since 1980, when per capita consumption was down to 16 lbs. Candy was perceived as having no nutritional value and contributory to poor health. Led by M&M/Mars, the candy industry responded by campaigning to position candy as "snack" food, rather than "junk" food. M&M/Mars moved advertising from kiddie oriented TV shows to adult oriented shows, specifically sports programs. The audience they are trying to reach is the 18-34 year old category. Emphasis is also being placed on the wholesome ingredients in candy — milk and nuts, for example.

M&M/Mars is dominating the marketplace, producing six of the country's top ten candy products, with *Snickers* leading by a wide margin. M&M/Mars controls approximately 43.3% of the industry, compared to Hershey's 25.6%. Peter Paul Cadbury was third with 8.3% and the remainder (22.8%) was divided among the hundreds of other manufacturers. According to DEBS Report figures for items sold through tobacco and candy distributors, *Snickers* alone accounts for 6% of all candy sales. Other M&M/Mars products in the top ten are *M&M peanuts* (No. 2), *M&M plain* (No. 4), *Three Musketeers* (No. 5), *Milky Way* (No. 6) and *Twix* (No. 9). Hershey holds the No. 3 spot with *Reese's Peanut Butter Cups*, No. 7 with *Kit Kat*, No. 8 with almond bars, and No. 10 with the milk chocolate bar.

M&M/Mars is maintaining its control of the industry, according to the LNA Report, by spending an estimated \$55.5

million last year on advertising, compared to an estimated \$36.5 million for Hershey.

In 1984, a Finnish food processor, Huhtamaki, emerged as a major factor in the U.S. candy industry. Huhtamaki, which purchased most of the confectionery operations of the Beatrice Company and a confectionery subsidiary of General Mills, became one of the five largest U.S. confectionery producers. Also during 1984, the Nestle Co. acquired the candy brands of Ward-Johnson, Inc., in an effort to broaden its product line.

In 1984, candy manufacturers taking advantage of the perceived healthful nature of granola bars, by enrobing them in chocolate. The products are being distributed through traditional candy channels, and are also available in the breakfast foods, candy and snack foods sections of grocery stores.

According to the U.S. Industrial Outlook, U.S. manufacturers, responding to recent increases in the adult population and changing taste preferences, have been emphasizing chocolate candy production. In 1983, according to the Census Bureau, the volume of chocolate candy shipped was about 2.2 billion pounds and represented almost 57% of all U.S. candy shipments. In comparison, chocolate candy represented 51% of 1978 candy shipments. In value, chocolate candy shipments reached about \$4 billion, totaling 70% of U.S. candy makers' shipments in 1983. This was a slight increase from the 67% share recorded in 1978.

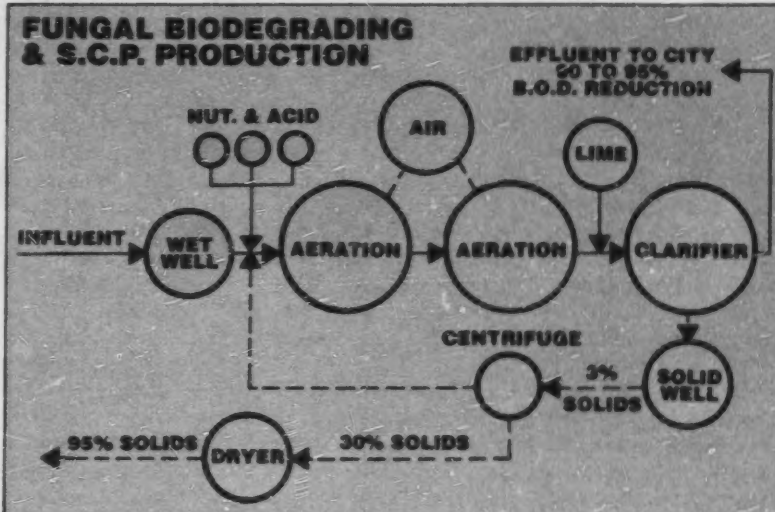
Deteriorating balance of trade

In 1984, the U.S. candy trade balance continued to deteriorate. The value of imports was \$236 million, surpassing 1983 by 28%. The quantity of candy imported rose 34% to 228 million pounds. The average price per pound for imported candies declined by 4% to \$1.03 per pound. The quantity and value of nonchocolate candy imports rose 14% and 26%, respectively in 1984, while the average price per pound declined 9%. The value of chocolate imports reached \$127 million for the year, up 44%, while the quantity imported increased about 49% to 88 million pounds. The value of U.S. candy exports rose more than 15% from depressed 1983 levels, reaching about \$74 million.

The growing importance of expensive chocolates is reflected in increasing U.S. imports from six Western European nations — Belgium, West Germany, Switzerland, France, Italy and the Netherlands — which specialize in producing this type of candy. In 1984, the value of U.S. chocolate candy imports from these six countries increased almost 74%, following an 87% rise in '83.

Special Emphasis PROCESSING EQUIPMENT

Lactose permeate-to-protein project may give dairies a "free" feed source



Using a fast growing fungi, this pilot process converts the influent (lactose permeate) into single cell protein (SCP) which can be used in high-quality animal feed. The fungi metabolizes the lactose permeate in about 12 hours, producing solids with about 40% protein content.

In May, 1985 (Page 178), *Food Engineering* reported the promising results to date of the dairy-farm ultrafiltration test sponsored jointly by the California Milk Advisory Board and Dairy Research, Inc., a subsidiary of the United Dairy Industry Association.

According to preliminary data released by CMAB halfway into the 12-month study, milk concentrated by 50 percent via ultrafiltration at the farm before shipping to cheesemakers cuts costs by 8 cents per cwt for the dairy farmer and by 69 cents per cwt for the cheesemaker for a total savings of 77 cents per cwt. The study is still in progress.

Now, UDIA is taking the process a step further with a pilot project to convert the lactose permeate—currently fed back to the cows—to a higher-quality feed product through farm-level fungal biodegradation of the permeate to single cell protein.

Plans for the pilot study were reported by Dr. Anthony J. Luksas, senior vice president for commercial research and development for UDIA, at Cheesemaking Symposium '85 sponsored by Chris Hansen's Laboratory May 1-2 in Milwaukee. More than 300 people from all segments of the dairy industry attended.

"Application of single-cell protein (SCP) technology to the permeate pro-

vides the opportunity to the dairy farmer to produce a high-quality feed that he now has to purchase from the outside," said Luksas.

Fast-growing, easily-cultured fungi can convert lactose permeate emanating from the UF process to SCP, Luksas continued. The fungus selected for the pilot system is *Aspergillus oryzae*, accepted by FDA for food applications and used to produce several food enzymes as well as to pretreat grain for soy-sauce production. Laboratory trials have shown that *A. oryzae* can in 12 hours metabolize a permeate stream of 3 percent solids to produce a mycelial biomass (equivalent to about half the original solids) of 40 percent protein with good amino-acid profile, low nucleic acid content and low fat content while reducing BOD, of the permeate by more than 95 percent, Luksas reported. (The disadvantage of feed with a high nucleic acid content, Luksas pointed out, is in the uridine content of the RNA, which can be metabolized to uric acid with consequent hazard of gout in the animal).

UDIA plans pilot scale-up as shown in the adjoining illustration at Utah State University, Logan, Utah, Luksas reported. The pilot plant will produce 300 lbs. of SCP per day to be fed to cattle in three forms: Liquid slurry (4 percent solids);

Economics (100,000 gal/day)	
Single Cell Protein Facility	
Initial Cost	\$300,000
Income:	\$1,650,000
Yield-12.5 Tons	
SCP/day (dry Weight) or	
4.125 tons/yr @ \$400	
Annual Cost	
Amortization	\$42,706
\$300,000 at 13%, 20 yrs	
Operation and Maintenance	
Power	\$31,363
Manpower	\$18,250
Maintenance	\$6,000
Chemicals	\$5,000
Taxes, Misc.	\$5,000
Total	\$108,319
Economics	
Income	\$1,650,000
Less Annual Cost	108,319
Pre-Tax	
Net Income	\$1,541,681

A dairy can create \$1.5 million in pre-tax income by converting lactose permeate into single-cell protein based feed, according to calculations by the California Milk Advisory Board and Dairy Research, Inc., a subsidiary of the United Dairy Industry Association.

dewatered cake (35 percent solids) and dried (90 percent solids). Trials are designed to determine feed efficiency plus impact of the feed on milk production, composition and flavor.

According to the figures shown in the table above, preliminary economics appear favorable: For a plant capable of handling 100,000 gal. of permeate per day, a capital investment of \$300,000 plus annual operating costs estimated at \$108,500 will yield pre-tax income of more than \$1.5 million.

A smaller system designed to process 10,000 gal. of permeate per day would be about one-tenth as costly and one-tenth as profitable, Luksas added.

Preliminary studies show that the smallest cost-effective system—or the smallest system offering payback of capital investment in less than three years—would have a capacity of 1,000 gal. permeate per day.

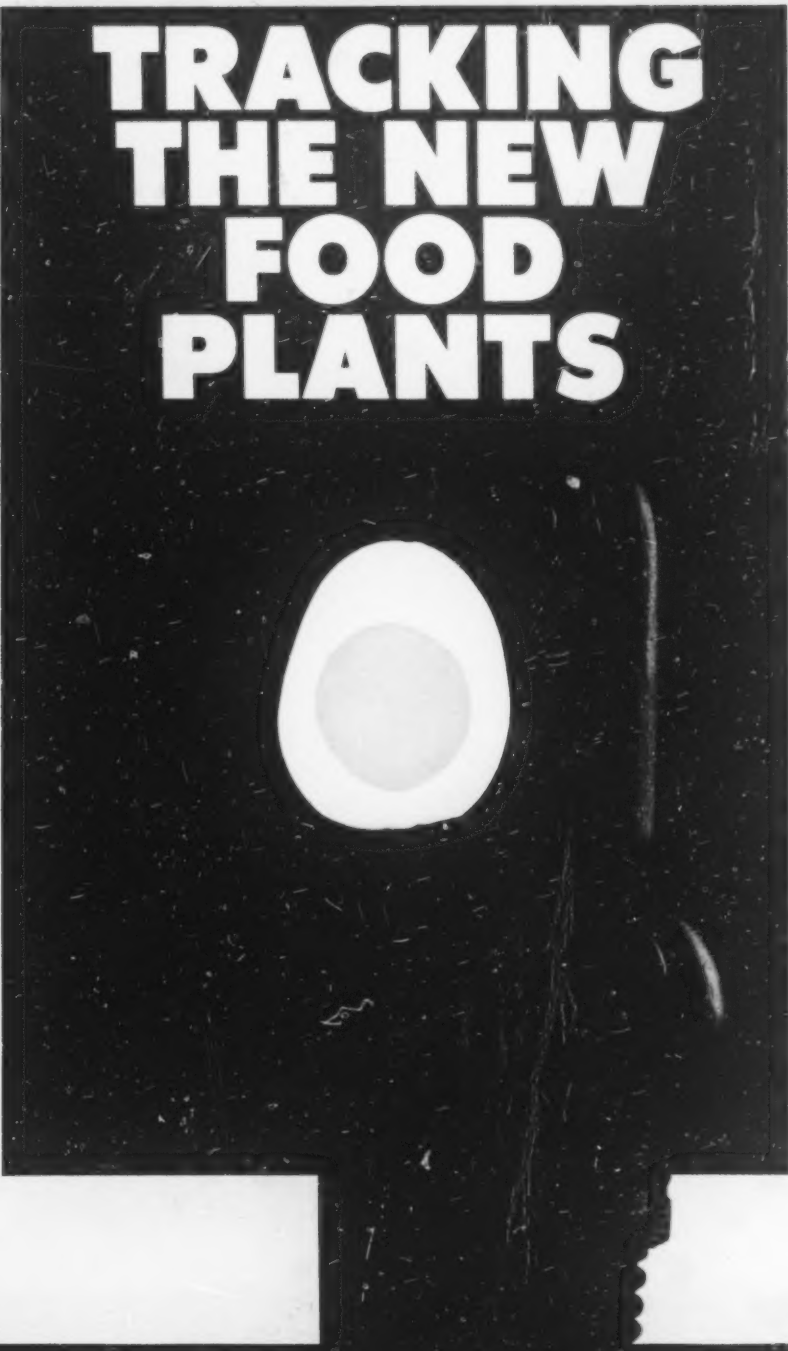
SEPTEMBER 1985

Chilton's Food Engineering

In this issue:

ENGINEERED FOODS

TRACKING THE NEW FOOD PLANTS



Who's Building What, Where

FE surveys the action in start-ups, expansions. Who's betting big on the future?

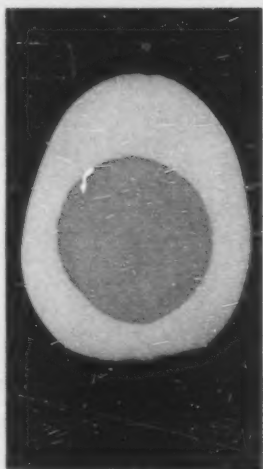
Aseptic Dominates DFISA Show

8 of the 10 largest booths will feature either aseptic processing or packaging.

IFT Review... Part II

Continuing show coverage of sweeteners, gums, vegetable proteins, sodium, etc.

Chilton's Food Engineering



ABOUT THE COVER

Food Engineering's eighth annual New Plant Survey discloses new or expanded food plants planned, being built or completed during 1985.

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28 Biotechnology comes of age

Scientists throughout the food industry are altering the genetic structures of fruits, vegetables and food ingredients in search of the ultimate food product.

31 Monsanto buys Searle

The \$2.7-billion acquisition of the makers of aspartame comes in the midst of an expanding controversy over the safety of the sweetener.

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Aimed at the fast-growing specialty bread market, this refrigerated dough product is comparable to fresh. **PAGE 38**

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NEW FOOD PLANTS: Food Engineering's eighth annual New Plant Survey discloses new or expanded food plants planned, being built or completed during 1985. **PAGE 76**

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Genetic research at University of Delaware will aim at improving properties, yield and disease resistance of vanilla beans.

60 VegiSnax

Here are vegetables that taste better than the real thing, celery without strings and sweeter, crunchier carrot sticks.

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FDA approval for aspartame sweetened frozen desserts would open the floodgates for a new wave of low-calorie desserts.

65 Soluble Fiber

Soluble dietary fibers add nutrition, and can add functionality to instant beverages.

68 Chudge

It's neither fudge nor cheese alone, but a cheese-fudge combination. Started as a deli hit, it's now sold retail.

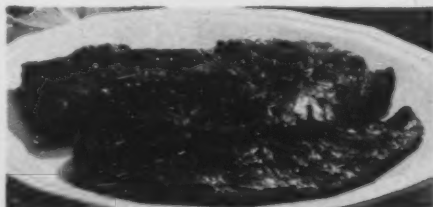
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Americans are turning to more mainstream Mexican foods. Here's one increasing in popularity.

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FAJITAS: Americans are turning to more mainstream and authentic Mexican foods. Here's a profile of one that is increasing in popularity.

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SANITARY PUMP LAB: By testing samples of actual products, the lab offers a new level of precision in pump performance measurement.

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Special Emphasis

QUALITY CONTROL EQUIPMENT:

Special focus is given to Quality Control equipment in this month's new product section.

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LOOKING AHEAD . . .
by Dr. A. Elizabeth Sloan

Chemical Confusion

Several key executives in the food industry have told me that, in their opinion, consumers are no longer concerned about food chemicals. These industry leaders feel that consumers have become so preoccupied with "nutrition" concerns, such as the sodium, cholesterol and calcium content, that they have lost interest in the food-chemical issue.

This perception of the consumer attitude toward food chemicals is *wrong*. In fact, numerous *Good Housekeeping* studies show the opposite to be true: Consumers are now more concerned about chemicals in food than with nutrition issues, and they want the industry to find alternatives to chemical use.

In May of last year, we questioned women about their degree of concern with 15 food-related areas. Fully 76% said they are "extremely concerned" to "very concerned" about the chemicals in food, and another 20% said they are "somewhat concerned."

A much higher percentage of the participants expressed a high-to-extreme concern about food chemicals than about the sugar content of food (65%), sodium content (59%), caffeine content (51.5%), and even calorie content (60.5%). In fact, the food-chemical issue ranked fourth in importance, after "freshness dating on food packages," "the price of food," and "the nutritional value of food."

This year when we asked consumers to name their major food concerns, "avoiding harmful additives/preservatives/chemicals" moved to the *top* of their list, preceding freshness of foods, sodium content, sugar content, calorie count, and even "high food prices."

Yes to no's

Today's consumers want high-quality

food products, and they feel that the *absence* of chemicals in a product improves quality while the *presence* of chemicals lowers it.

We asked consumers to rate seventy-five phrases commonly found on food packages having a positive or negative effect on their decision to buy the products. On a scale of +3 to -3, they rated the labels "no artificial preservatives," "no artificial ingredients," and "no artificial coloring" as being *positive* influences on their decision to buy a product (+1.91, +1.89, +1.88 and +1.85, respectively), and they rated the labels "a preservative to ensure freshness," "artificial color," and "artificial flavor," as being *negative* influences (-.23, -1.27, and -1.41, respectively).

Consumers believe that the presence of chemicals in a food product detracts from its quality because they think that "natural" is more nutritious and tastes better. When we asked women to agree or disagree with 12 statements about "natural" food, we discovered that 71.5% agreed with the statement, "natural foods are always better for you than processed foods," 68.5% agreed that "natural foods are more nutritious than other foods," and 63% agreed that "organically grown foods are better for you than foods grown with synthetic fertilizer and pesticides."

More than three-fourths of the consumers said that artificial flavoring has a poorer taste than natural flavoring. Their descriptions of artificial flavoring ranged from too salty to too sweet, from strong-tasting to flat-tasting, from bitter to greasy. Although they didn't agree on what is wrong with the taste of artificial flavoring, the consensus was that "natural flavorings are of better quality."

Consumers use labels

The majority of consumers are using labels to avoid buying products that contain chemicals. When we asked consumers how often they use information about chemical additives on labels in making purchasing decisions, 34% said they always use such information, 37% said they frequently use it, and 19.5% said they occasionally use it. Eighty percent rated information about chemical additives on food labels as being important. And from 60 to 66% of our respondents said they try to avoid buying foods that contain preservatives, artificial flavors, and artificial colors.

Although the majority of consumers say that they are trying to avoid foods containing chemicals, they are still purchasing these foods. In one study, 87% of the participants disagreed with the statement, "I never buy any foods that contain artificial ingredients." However, 48.5% of this group say they worry about using food with artificial ingredients.

Consumers are still purchasing foods containing chemicals because they are willing to trade off the absence of chemicals for the benefits those chemicals provide. Our research indicates, however, that this attitude may be changing.

We asked women the following question: "When buying chewy cookies, would you prefer those with preservatives that keep them chewy and fresh-tasting or those without preservatives even though the cookies would become somewhat hard?" A surprising 54.5% said they would prefer the cookies with no preservatives even though the cookies would become somewhat hard.

We asked this same group about the use of artificial ingredients in diet foods and beverages. Of the 65% who said that

CONSUMER CONCERNS

Consumers are still concerned about chemicals in foods and beverages, according to Good Housekeeping Institute survey findings. They want industry to find alternatives.

High to extreme concern:

Chemical content	76.0%
Sugar content	65.5%
Sodium content	59.0%
Caffeine content	51.5%
Calorie content	60.5%

Major concern for:

Chemical preservatives	75%
Electromagnetic energy/ionized	41%
Irradiation	19%

they buy diet products, only 15% said, "The weight loss is more important to me than the additives." Another 31.5% said, "I worry about the additives but buy (the products) anyway." These dieters are "on the fence." Right now they are willing to accept the presence of chemicals in diet products to have the benefit of reduced calories, but they worry about the additives. If a line of diet products without chemicals were introduced—products comparable in price and quality to diet products that contain chemicals—dieters probably would switch to the new line.

Some consumers are even willing to trade a lower price for the "higher quality" of a product without chemicals. Forty-four percent of one survey group agreed with the statement, "I am willing to pay up to 10% more for a food that is natural," and 11.5% were undecided.

One of our most significant findings has been that consumers are now so concerned about chemical preservatives that they are willing to consider any

alternative to their use. When we asked consumers if they preferred chemicals or irradiation as a means to preserve food, 44% said they don't know enough to judge, 27% said they don't want either method, a surprising 23% said they prefer irradiation, and only 3% said they prefer preservatives! The majority of respondents in all the groups except the one preferring preservatives expressed strong feelings against the use of chemicals. Typical comments were: "Preservatives are harmful/unsafe/carcinogenic," "I don't like chemicals/additives in anything," and "I don't know what irradiation is, but I don't like preservatives."

In this same survey, three-fourths of the women said that "foods grown using chemical sprays" and "foods with chemical preservatives" are major concerns to them. In contrast, 41% said that "foods treated with electromagnetic energy/ionized" is a major concern to them, and only 19% said that "foods irradiated to prevent spoilage" is a major concern.

Clearly, consumers fear chemicals far more than they fear new processes about which they know very little!

Why do consumers have such a strong fear of chemicals? Primarily it is because they equate chemicals with cancer. Eighty-two percent of the participants in one of our surveys agreed with the statement, "Chemicals can cause cancer." When we asked the members of another survey group about their fear of illness from artificial ingredients, 55% said they fear possible cancer.

Another 26% of this group said that they fear a possible allergic reaction from chemicals. One-third said that they have a "serious" concern about food allergies, and 22% claimed that they avoid certain foods on the mere possibility that they contain an allergen.

Consumers are frightened by even the smallest amount of a "problem" ingredient in a food. In response to the question, "If an ingredient is feared, does the smallness of the amount help to reduce the fear?" almost half of the participants answered, "No. I fear even the smallest quantity," and 22.5% weren't sure.

Part of the problem is that many consumers connect food chemicals with *all* chemicals, and, therefore, food chemicals suffer "guilt by association." Fifty-five percent of our respondents admitted that they think there is a connection between chemical spills and toxic waste and their feelings about chemicals in foods, and another 13% said they aren't sure.

When asked if chemicals are ever good for us, 19% said no, and a surprising 43% said they don't know.

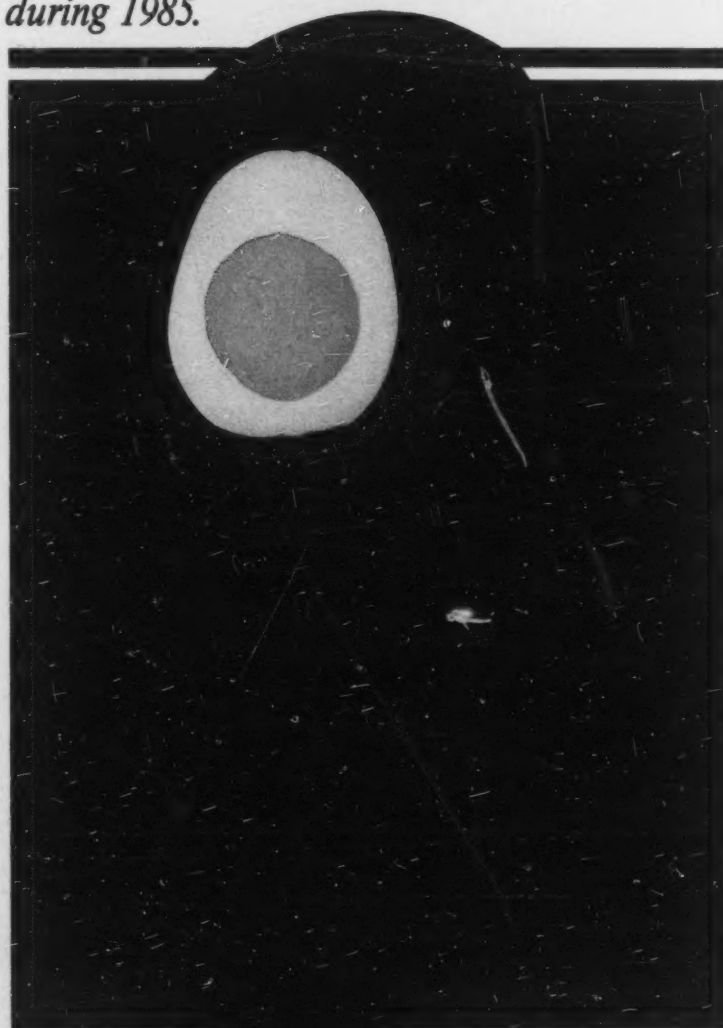
We asked consumers, "If you were able to talk to the food technologists who work at the major food companies developing new food products, what message would you want to give them?" The first message on our consumers' list of advice was this: Use fewer chemicals or *no* chemicals in our food! Three-fourths of our respondents gave such advice as, "Add nutrients/vitamins but not chemicals," and "Develop a way to have fresh foods without preservatives."

Technologists would be wise to heed this advice. The food-chemical issue has not "cooled off." On the contrary, it has become—and will continue to be—one of the major food concerns of our time.

Dr. Sloan is Director of the Good Housekeeping Institute, the major editorial service and technical division of Good Housekeeping magazine.

TRACKING THE NEW FOOD PLANTS

Food Engineering's eighth annual New Plant Survey discloses new or expanded food plants planned, being built or completed during 1985.



Food Engineering's eighth annual survey of new food plants—compiled from studies conducted by Food Engineering and Conway Data, Inc. (Atlanta)—totals 295 new and expanded food plants completed, under construction or planned during 1985. This compares to 201 in 1984, 193 in 1983 and 174 in 1982.

Probable reason for this year's surge in spending for new construction: Falling interest rates. During the past year, the prime rate plunged a full 3.5 percent—from 13 percent on July 31, 1984 to 9.5 percent on July 31, 1985.

Due to space limitations, only 210 of the 295 plants are listed on the following pages. Deleted from this year's listing are: 1.) Warehouses and distribution centers; 2.) Feed and pet-food plants; 3.) Rendering plants; 4.) Projects where primary product was unreported; 5.) All projects where estimated costs are known to be less than \$1 million.

Half—106 of the 210 plants listed—are expansions rather than new construction.

A brief study of the following pages confirms current food-industry trends:

- Low-fat/low-cholesterol: No less than 10 percent—or 21 of the 210 plants listed—are poultry processing plants.

- The shift to the Sun Belt: This year, 31 percent—65 of the 210 plants listed (93 of the 295 plants in the complete survey)—are concentrated in the 11 states which once comprised the Confederacy.

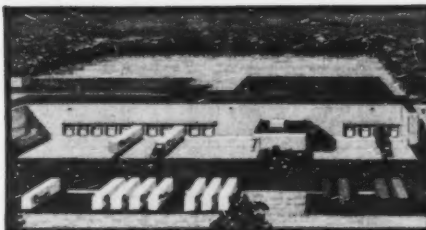
- Beer wars: Anheuser-Busch's dominant share-of-market continues to rise, reflected in the fact that—while a new Miller brewery stands idle at Trenton, Ohio—Anheuser-Busch is expanding or renovating seven plants and building a new one at Fort Collins, Colo., right in Coors' backyard. Apart from Budweiser, only regional brewers such as Hudepohl in Cincinnati, Brick and Carling O'Keefe in Canada are building new facilities.

- Cola wars: Coca-Cola bottlers are building or expanding nine plants (six are listed); Pepsi bottlers are building or expanding 11 facilities (nine are shown). Growing soft-drink consumption and the recent shift to 100-percent HFCS are shown in expanded production by Staley, Cargill and CPC International.

In the following tables, "status and date" refer to project status and the date that status was reported. "Planned" means site has been selected but construction not yet underway on the date reported. "Construction" means building was in progress on the date shown. "Completed" is self-explanatory. Some startup dates are listed. Where status of a project is unknown, it is simply shown as "Reported."

CHARLES E. MORRIS
Midwest Editor

NEW FOOD PLANTS



New 108,000 sq. ft. Atlantic Food Services fresh fish and poultry distribution center in Prince William County, Va., will appear as shown at start-up in Sept. 1986.

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
A							
A.E. Staley Mfg. Co.	Lafayette, Ind.	Corn syrups	Expansion	19.0	4	--	Construction 1/85
A.E. Staley Mfg. Co.	Louden, Tenn.	HFCS & ethanol	Expansion	--	--	PSI	Completed 4/85
All-Amer. Gourmet	Atlanta, Ga.	Frozen foods	--	14.5	300	--	Construction 6/85
Amalgamaize Co.	Decatur, Ala.	HFCS	Expansion	15.0	15	--	Construction 1/84
Amick Poultry Co.	Muscogee Cty., Ga.	Processed poultry	Expansion	--	50	--	Completed 10/84
Anderson-Clayton	Woburn, Mass.	Edible oils, prepared food	--	1.0	--	--	Planning 5/85
Andrew Wolf Wine	Stoney Plain, Alb.	Wine	12,000	2.0	15	--	Construction 12/84
Anheuser-Busch Co.	Los Angeles, Calif.	Beer	Renovation	--	--	MK-Ferguson	Continuing
Anheuser-Busch Co.	Fort Collins, Colo.	Beer	--	400	550	MK-Ferguson	Eng. thru '85
Anheuser-Busch Co.	Jacksonville, Fla.	Beer	Renovation	--	--	MK-Ferguson	Completion '86
Anheuser-Busch Co.	St. Louis, Mo.	Beer	Renovation	--	--	MK-Ferguson	Completion late '86
Anheuser-Busch Co.	Merrimack, N.H.	Beer	Renovation	--	--	MK-Ferguson	--
Anheuser-Busch Co.	Newark, N.J.	Beer	Renovation	100	400	Sverdrup	Construction 5/85
Anheuser-Busch Co.	Houston, Tex.	Beer	550,000	100.0	440	MK-Ferguson	Completion late '85
Anheuser-Busch Co.	Williamsburg, Va.	Beer	Renovation	--	--	MK-Ferguson	Completion '86
Associated Dairies	Boise, Idaho	Ice cream	--	2.2	10	DESCORP	Startup 12/85
Astro Dairy Prod.	Amsterdam, N.Y.	Yogurt, sour cream	--	3.0	50	--	Planning 5/85
Atlantic Food Serv.	Prince Wm. Cty., Va.	Fresh fish & poultry	108,000	--	100	St. Onge Ruff	Startup 9/86
Auten Poultry Co.	Muscogee Cty., Ga.	Poultry products	--	--	5	--	Planning 12/84
B							
Banquet Foods	Turlock, Calif.	Frozen dinners	Expansion	2.5	600	--	Planning 5/85
Banquet Foods	Macon Cty, Mo.	Boneless chicken	25,000	4.0	139	--	Construction 12/84
Bay Springs Foods	Bay Springs, Miss.	Processed chicken	--	--	75	--	Construction 4/85
Beatrice Foods	Nashville, Tenn.	Dairy products	--	--	--	--	Planning 1/85
Bev-Pak, Inc.	Scotia, N.Y.	Soft drinks	Expansion	8.0	50	--	Planning 4/85
Black Hills Packing	Pennington Cty., S.D.	Meat products	Expansion	--	20	--	Completed 7/84
Bloch Guggenheimer	Hurlock, Md.	Pickles	144,000	9.0	400	--	Planning 4/85
Borden, Inc.	Houston, Tex.	Ice cream	92,000	30.0	160	--	Planning 10/84
Brick Brewery	Waterloo, Ont.	Beer	35,000	2.0	--	--	Planning '2/84
Brown & Haley Co.	Tacoma, Wash.	Confections	7,000(Expansion)	--	68	--	Construction 12/84
Buffalo Rock Co.	Birmingham, Ala.	Soft drinks	86,000	3	500	--	Construction 3/85
C							
Cal-Co Frozen Foods	Europa, Miss.	Frozen vegetables		6.0			Construction 4/85

NEW FOOD PLANTS



Gabled, campus-type buildings of new Country Epicure bakery, designed and built by St. Onge Ruff & Associates in West Chester County, NY., complement the adjacent residential neighborhood. Start-up is planned for summer, 1986.

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
Campbell Soup Co.	Sumter, SC	Frozen foods	Expansion	--	200	--	Completed 10/84
Camisco Produce Co.	Osceola, Iowa	Mushrooms	--	--	200	--	Planning 12/84
Capital Resources	Marshall Cty., Iowa	Meat packing	--	--	100	--	Completed 1/85
Cargill Inc.	Eddyville, Iowa	HFCS, corn syrups, starch	800 mil lbs. syrup & 150 mil lbs. starch/yr.	100.0	--	PSI	Startup early '85
Cargill, Inc.	Sioux City, Iowa	Soybean oil	Expansion	16.0	15	--	Construction 1/85
Cargill, Inc.	Woodbury Cty., Iowa	Soybean oil	--	15.0	29	--	Planning 12/84
Carling O'Keefe	Calgary, Alb.	Beer	9,000(Expansion)	1.3	120	--	Reported 4/85
Carolina Turkeys	Duplin Cty., N.C.	Turkey products	220,000	25.0	800	Hughes, Schilling Dixon	Startup 6/86
Capt. Crab Seafood	Leon Cty., Fla.	Seafood	40,000	1.5	75	--	Reported 12/84
Central Soya Co.	Chattanooga, Tenn.	Soybean meal	Expansion	--	--	--	Reported 1/85
Charles Freihofer	Albany Cty., N.Y.	Bakery products	86,000	10	--	--	Planning 12/84
Chase & Sanborn	New Orleans, La.	Coffee	Expansion	2.9	25	--	Reported 5/85
Chateau Elen	Braselton, Ga.	Wine	--	--	50	--	Completed 1/85
C.J. Viter Co.	Chicago, Ill.	Potato chips, popcorn	9,000(Expansion)	--	--	--	Completed 3/85
Coca-Cola Bottling	Middlesboro, Ky.	Soft drinks	Expansion	1.0	50	--	Completed 1/85
Coca-Cola Bottling	Rapid City, S.D.	Soft drinks	30,000	--	--	--	Construction 1/85
Coca-Cola Bottling	Roanoke, Va.	Soft drinks	Expansion	14.5	--	--	Construction 4/85
Coca-Cola Foods Co.	Bristol, Pa.	Orange juice, fruit drinks	165,000	6-7	--	Ballinger	Startup autumn '86
Columbia Foods Co.	Boone Cty, Mo.	Frankfurters	56,000	--	110	--	Construction 12/84
Concordia Meat Co.	Lafayette City, Mo.	Beef, pork, turkey prod.	10,000	--	85	--	Construction 12/84
Consolidated Flavor	St. Louis, Mo.	Cocoa	29,000	--	--	--	Planning 8/84
Country Epicure	Westchester Cty, NY	Frozen bakery desserts	52,000	4	160	St. Onge Ruff	Startup mid-'86
CPC International	Argo, Ill.	Corn syrups, starch	Renovation	300.0	--	--	Startup 6/85
C. Ramirez & Sons	Tulia, Tex.	Tortillas, taco shells	21,000	1.3	80	--	Completed 1/85
Cuisine des Chef	Orange Cty., Fla.	Food-service products	12,000	--	40	--	Completed 12/84
Cuddy Foods Co.	Monroe, N.C.	Turkey products	Expansion	2.0	--	--	Construction 4/85
Cumberland Gap	Middlesboro, Ky.	Meat processing	Expansion	2.3	50	--	Completed 4/85
D							
Dairymen, Inc.	Atlanta, Ga.	Milk	Renovation	3.0	--	Sverdrup	Completion '87
Dairymen, Inc.	Wilkesboro, N.C.	Milk	Expansion	--	--	Hixson	Completion 9/85
Dakota Crackin' Inc.	Devil's Lake, N.D.	Eggs	--	10.4	179	--	Completed 3/85
Dalbyco Meat Pkrs.	Grundy Cty., Mo.	Breakfast steak, ham	--	--	60	--	Completed 12/84
Delicious Foods Co.	Hall, Neb.	Frozen foods	60,000(Exp)	4.5	210	--	Planning 12/84
DeRosa Pasta Co.	Wahoo, Neb.	Pasta	--	--	--	--	Planning 4/85
Dillon's Bakery	Hutchinson, Kan.	Bread, pastry	102,000(Exp.)	6.0	--	--	Completed 1/85
Domino Pizza	San Bernardino, Calif	Pizza dough, ingredients	45,000	1.6	100	--	Construction 12/84
Domino Pizza	DuPage City, Ill.	Pizza	29,000	--	40	--	Completed 12/84

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
Dothan Oil Mills	Dothan, Ala.	Peanut oil	Expansion	5.4	--	--	Reported 1/85
Dothan Oil Mills	Headland, Ala.	Shelled peanuts	Expansion	1.8	--	--	Reported 10/85
Dunkirk Ice Cream	Dunkirk, N.Y.	Ice cream	Expansion	7.7	115	--	Construction 5/85

E

E.A. Miller & Sons	Hyrum, Utah	Meat packing	Expansion	10.0	80	--	Reported 1/85
Eastern Block Co.	Henderson, N.C.	Nutrients	20,000	2.0	30	--	Completed 1/85
Eau Galle Cheese	Eau Galle, Wis.	Cheese	--	1.1	--	--	Planning 5/85
Edy's Ice Cream Co.	Fort Wayne, Ind.	Ice cream	--	8.5	90	--	Planning 4/85
Eileen Gilday, Inc.	Pittsburgh, Pa.	Irish taffy	40,000	1.5	35	Siebert Eng.	Startup 3/86
Energos Co.	Phoenix, Ariz.	Energy drinks	44,000	--	--	--	Completed 12/84
Enzyme Biosystems	Beloit, Wis.	Enzymes	30,000	--	--	--	Startup 2/85
Erie Casein Co.	Rochelle, Ill.	Milk proteins	--	--	--	--	Startup 6/85

F

Fanny Farmer Candy	Norwalk, Ohio	Boxed chocolates	90,000	1.0	350	Siebert Eng.	Startup 12/85
Fast Food Merch.	Monterey, Tenn.	Processed meats	Expansion	--	--	--	Reported 1/85
Ferrara Pan Candy	Forest Park, Ill.	Candy	20,000	--	120	Siebert Eng.	Startup 7/85
Flav-O-Rich Co.	London, Ky.	Milk, ice cream	Expansion	3.0	--	--	Completed 1/85
Flowers Baking Co.	Opelika, Ala.	Rolls	Expansion	4.0	--	--	Reported 10/84
FMC Corp.	New Castle, Del.	Ingredients	11,000	2.0	10	--	Planning 1/85
Folger Coffee Co.	New Orleans, La.	Coffee	Expansion	1.6	--	--	Completed 1/85
Four-R Poultry Serv	Barry Cty, Mo.	Boneless chicken	13,000	--	80	--	Completed 1/85
Frick Meat Packing	Audrain Cty, Mo.	Processed hams	24,000	1.5	25	--	Completed 12/84
Frigo Cheese Co.	Lena, Wis.	Cheese	Expansion	3.0	--	--	Construction 6/85

G

General Foods Corp.	Houston, Tex.	Coffee	Expansion	--	--	--	Reported 1/85
General Mills Corp.	Buffalo, NY	Cereals	Renovation	40.0	500	E&V, Inc.	Reported 5/85
Genseng-UP Corp.	Port Jervis, NY	Soft drinks	--	3.0	30	--	Planning 3/85
George A. Hormel	Fremont, Neb.	Meat products	Expansion	3.4	--	--	Construction 5/85
George A. Hormel	Kossuth, Iowa	Processed meats	36,000(Expansion)	--	50	--	Reported 1/85
Grand Mstrs. Winery	Halifax, N.S.	Wine bottling	--	2.0	--	--	Planning 6/85
Guernsey Dell, Inc.	Chicago, Ill.	Ice cream ingredients	70,000	--	125	Siebert Eng.	Startup 12/85

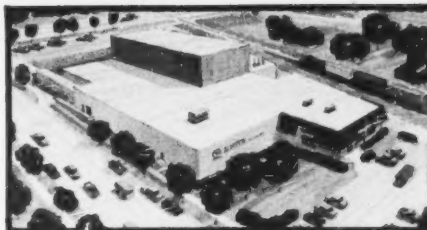
NEW FOOD PLANTS



Hannaford Bros. grocery distribution center at South Portland, Me., was expanded in spring, 1985 by one-third to 453,000 square feet. St. Onge Ruff planned and engineered the project.

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
H							
Harry Laws & Co.	Brustly, La.	Raw sugar	Expansion	1.4	--	--	Completed 4/85
Herman Goelitz Co.	Fairfield, Calif.	Candy	--	--	95	--	Construction 7/85
Heying Foods, Inc.	Guthrie Cty, Iowa	Processed egg products	--	2.3	60	--	Planning 12/84
Holly Farms Poultry	Monroe, N.C.	Processed poultry	Expansion	4.9	125	--	Planning 4/85
Holly Farms Poultry	Wilkesboro, N.C.	Processed poultry	250,000(Expansion)	6.0	50	--	Construction 1/85
Howard Beef Proc.	Miner Cty., S.D.	Meat packing	6,000(expansion)	--	50	--	Completed 10/84
Hudepohl Brewing	Cincinnati, Ohio	Draft beer	--	7.0	--	--	Construction 5/85
Hudson Foods Co.	Hope, Ark.	Processed poultry	Expansion	2.6	75	--	Planning 6/85
Hyplains Dress Beef	Dodge City, Kan.	Processed meats	Expansion	2.7	--	--	Completed 1/85
I							
Idle Wild Farr.	Pomfret, Conn.	Frozen foods	50,000	--	340	--	Planning 1/85
Inglennook/Napa Vly	Oakville, N.Y.	Wine	Expansion	6.0	--	--	Planning 5/85
Inglennook Vineyard	Rutherford, Calif.	Wine	12,300(Expansion)	--	--	Armco Atlantic	Completed 5/85
Int. Multifoods	San Benito, Tex.	Meat processing	30,000	2.9	50	--	Completed 2/85
Iowa Beverage Mfrs.	Wapello Cty, Iowa	Carbonated beverages	30,000	--	30	--	Reported 4/85
Iowa Pork Co.	Davis City, S.D.	Pork processing	20,000	2.0	50	--	Completed 12/84
Isaly Co./Klondike	San Bernardino, Calif.	Ice Cream bars	37,000	3.2	200	--	Completed 12/84
Island Vineyard	Laurel, N.Y.	Wine, spirits	Expansion	2.8	6	--	Planning 3/85
J							
JAC Creative Foods	Los Angeles, Calif.	Surimi products	36,000	4.0	--	--	Startup 1/85
Jacob Stern & Sons	Houston, Tex.	Vegetable oil	Expansion	2.4	--	--	Startup 4/85
James B. Beam Co.	Clermont, Ky.	Whiskey	--	4.1	--	--	Completed 1/85
Joan of Arc Co.	Turkey, N.C.	Canned vegetables	Expansion	--	32	--	Reported 1/85
Jordan Sausage Co.	Muscogee Cty., Ga.	Sausage	Expansion	--	20	--	Construction 12/84
K							
Kappler Dairy Co.	Medicine Hat, Alb.	Milk	2,000	1.2	10	--	Construction 12/84
Kellogg Co.	Battle Creek, Mich.	Cereal	--	100	--	--	Planning 5/85
Kibun Co.	Raleigh, N.C.	Seafood products	18,000	5.0	60	--	Completed 1/85
Kraft Foods	Bentonville, Ark.	Processed cheese	Expansion	10.0	--	--	Completed 4/85
Kraft Foods	Lawrenceburg, Ky.	Cheese	Expansion	3.0	--	--	Completed 1/85

NEW FOOD PLANTS



New \$5.7 million Smith Dairy Products ice cream and frozen desserts plant at Orrville, Ohio, incorporates high-density, computer-controlled warehouse. Designed and built by DESCORP, the plant started-up in August 1985.

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
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L

Lamb-Weston, Inc.	Richland, Wash.	French fries	20,000	5.2	150	--	Reported 1/85
Land O'Lakes	Brookings, S.D.	Cheddar cheese	6,000(Expansion)	--	40	--	Completed 7/84
Land O'Lakes	Clear Lake, Wis.	Puddings, dips	10,000	3.0	--	--	Reported 1/85
Larsen Co.	Fairwater, Wis.	Canned vegetables	25,000(Expansion)	1.7	3	--	Completed 12/84
Lauhoff Grain Co.	Danville, Ill.	Soy & corn processing	100,000(Exp.)	1.5	--	--	Reported 1/85
Lender's Bagel Bkry	Mattoon, Ill.	Bagels	--	10	--	--	Construction 5/85
LePage Bakeries	Lewiston, Maine	Bakery products	Expansion	--	680	--	Construction 1/85
Liberty Meat Pkg.	Liberty, N.Y.	Meat packing	91,000	7.7	32	--	Planning 3/85
Louis Trauth Dairy	Newport, Ky.	Milk, ice cream	Expansion	--	--	Hixson	Completion 1/86
Louisville Edb. Oil	Louisville, Ky.	Vegetable oil, shortening	Expansion	1.7	25	--	Completed 1/85

M

Made-Rite Sandwich	Chattanooga, Tenn.	Prepackaged sandwiches	--	--	--	--	Reported 1/85
Marshall Durbin	Canton, Miss.	Poultry products	Expansion	3.0	--	--	Construction 8/84
Marshall Durbin	Hattiesburg, Miss.	Poultry products	Expansion	2.0	42	--	Construction 8/84
Mexican Org. Prod.	Fayetteville, Ark.	Mexican foods	Expansion	5.0	200	--	Completed 12/84
Montfort of Colo.	Hastings, Neb.	Processed meats	150,000	9.5	500	--	Completed 11/84
Mrs. Best Maid Prod	Fort Worth, Tex.	Salad dressings	Expansion	4.0	--	--	Planning 4/85
MS Foods Co.	Plainview, Tex.	Frozen Mexican foods	30,000	1.0	20	--	Reported 1/85

N

National Distillers	Frankfort, Ky.	Whiskey	Expansion	2.0	--	--	Completed 1/85
Nat. Starch & Chem.	N. Kansas City, Mo.	Starch	Expansion	--	200	--	Planning 4/85
Nestle Co.	Granite City, Ill.	Instant tea	Expansion	7.0	25	--	Reported 1/85
Nestle Co.	Burlington, Wis.	Instant drinks, choc. bars	37,000(Exp.)	2.0	100	--	Construction 5/85
New Energy of Ind.	South Bend, Ind.	Ethanol	--	126	150	Davy McKee	Startup 10/84
New England Ethanol	Auburn, Maine	Ethanol	--	1.0	295	--	Planning 1/85
North American Corp	Mirabel, Que.	Bottled water	46,000	10.0	50	--	Construction 1/85
N.C. Processing Co.	Goldsboro, N.C.	Turkey products	--	--	1000	--	Planning 4/85

O

Owensboro Grain Co.	Owensboro, Ky.	Soybean oil	Expansion	10.0	15	--	Completed 4/85
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NEW FOOD PLANTS



Artist's rendering of new \$2.2 million ice cream/frozen desserts plant of Associated Dairies at Boise, Idaho, designed and built by DESCORP. Both raw material and finished product storage incorporates rack-supported structure to reduce building costs.

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
P							
Packerland Packing	Scotts Bluff, Neb.	Meat packing	200,000	--	135	--	Reported 2/85
Pate Foods Co.	Winnebago, Ill.	Snack foods	200,000	2.0	50	--	Completed 12/84
Pepperidge Farms	Huron City, Ohio	Baked goods	--	--	--	--	Reported 12/84
Pepsi-Cola Bottling	Buena Park, Calif.	Beverages	Renovation	--	--	MK-Ferguson	Completion '85
Pepsi-Cola Bottling	Howell, Mich.	Beverages	Renovation	--	--	MK-Ferguson	Completion '86
Pepsi-Cola Bottling	Charlotte, N.C.	Soft drinks	48,000(Expansion)	4.0	--	--	Completed 1/85
Pepsi-Cola Bottling	Atlantic City, N.J.	Soft drinks	39,000	1.8	100	--	Construction 2/84
Pepsi-Cola Bottling	Mays Landing, N.J.	Soft drinks	Expansion	--	50	--	Construction 5/85
Pepsi-Cola Bottling	Ashwaubenon, Wis.	Soft drinks	100,000	2.5	--	--	Construction 12/84
Pepsi-Cola Bottling	Queens, N.Y.	Soft drinks	400,000	42	--	--	Construction 4/85
Pepsi-Cola Bottling	Winnebago City, Wis.	Soft drinks	--	--	15	--	Completed 12/84
Pepsi-Cola Bottling	College Point, N.Y.	Soft drinks	Expansion	--	164	--	Planning 3/85
Perdue, inc.	Salisbury, Md.	Edible oil products	--	--	--	PSI	Startup 2/85
Pilgrim Industries	DeQueen, Ark.	Processed poultry	Expansion	--	226	--	Completed 12/84
Pizza Ent. of Miami	Altus, Okla.	Frozen pizza	--	1.5	80	--	Planning 4/85
Presto Food Prod.	City of Industry, Cal	Frozen desserts, toppings	--	--	95	--	Construction 7/85
Purity Dairies	Nashville, Tenn.	Milk	Expansion	2.2	--	--	Planning 1/85
Q							
Quail International	Greensboro, N.C.	Quail	--	--	60	--	Completed 1/85
Quaker Oats Co.	Oakland, Calif.	Foods & beverages	--	--	--	MK-Ferguson	Completion '86
Quaker Oats Co.	Jackson, Tenn.	Frozen pancakes, waffles	Expansion	--	--	--	Reported 1/85
Quality Assured	Stockton, Calif.	Canned tomatoes	80,000	5.0	50	--	Construction 2/85
Qual. Candy Shoppes	St. Francis, Wis.	Boxed chocolates	45,000	2.0	50	Siebert Eng.	Completion '86
R							
Rachelli Co.	Saint Laurent, Que.	Ice cream	17,000	1.8	20	--	Completed 1/85
RadiationTechnology	Elizabeth, N.J.	Grain irradiation	2,500 lbs./min.	--	--	--	Completion mid-'86
RadiationTechnology	Salem, N.J.	Grain irradiation	2,500 lbs./min.	--	--	--	Completion late '85
Ragu Foods	Owensboro, Ky.	Spaghetti sauce	Expansion	9.0	--	--	Completion 4/85
Ridgerview Foods	Whitehall, Wis.	Mozzarella cheese	60,000	7.0	50	Pasilac	Startup 9/84
Rogers Foods Co.	Turlock, Calif.	Dehydrated spices	75,000(Expansion)	--	23	--	Completion late '85
Ross Laboratories	Casa Grande, Ariz.	Infant formulas	500,000	--	--	Sverdrup	Startup mid-'85
R. Twining & Co.	Greensboro, N.C.	Bagged tea	55,000(Exp.)	7.5	40	--	Construction 1/85

NEW FOOD PLANTS

Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
S							
Salem Coca-Cola	Seabrook, N.H.	Soft drinks	57,000(Expansion)	--	--	--	Completed 3/85
Sanwa Foods	Atlanta, Ga.	Noodles	--	--	140	--	Reported 4/85
Sara Lee Corp.	Chickasaw Cty., Iowa	Bakery products	Expansion	--	220	--	Completed 12/84
Seaboard Farms	Chattanooga, Tenn.	Broiler chickens	Expansion	--	--	--	Reported 1/85
Sea Farm, Ltd.	Charlotte, N.B.	Salmon processing	--	2.6	7	--	Reported 12/84
Seagram Wine Co.	Monterey, Calif.	Wine	Expansion	20.0	100	--	Reported 4/85
Service Packing Co.	Joplin, Mo.	Meat processing	Expansion	3.0	200	--	Construction 4/85
Seigi Sausage House	Tulsa, Okla.	Sausage	11,000	1.0	30	--	Construction 12/81
Smith Dairy Prod.	Orville, Ohio	Ice cream	--	5.7	20	DESCORP	Startup 8/85
Southern Belle	Tupelo, Miss.	Pork products	Expansion	4.0	50	--	Completed 1/85
Southern Style Pot.	High Point, N.C.	Potato chips	--	--	60	--	Construction 8/84
Spangler Candy Co.	Bryan, Ohio	Candy	Expansion	--	--	--	Construction 5/85
Specialized Ice Pkg	Orange City, Fla.	Deionized ice cubes	20,000	3.0	100	--	Completed 12/84
Star Kist Canada	Charlotte Cty, N.B.	Fish processing	Expansion	4.2	--	--	Completed 12/84
Stevenson Crab Co.	Windsor, N.C.	Seafood processing	--	--	75	--	Construction 8/84
Stevia Co.	Pueblo, Colo.	Natural sugar substitute	22,000	6.0	100	--	Construction 12/84

CULBRO MACHINE SYSTEMS

+

HH

Harro Höfliger

Packaging Machinery

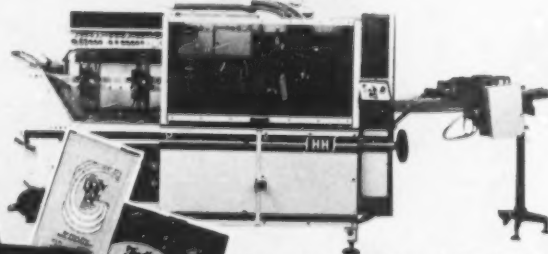
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Company	Plant Location	Primary Product	Square Feet/Cap.	Est. Cost (\$-Millions)	Employees	Architects Engineers	Status & Date
Stouffer Foods Corp.	Provo, Utah	Frozen foods	--	--	--	--	
Stouffer Foods Corp.	Springville, Utah	Frozen foods	287,000	75.0	1,200	--	Construction 1/85
Sutroco	Wilmington, Del.	Orange-juice concentrate	--	7.0	--	--	Completed 1/85
Swaggerty Sausage	Knoxville, Tenn.	Processed meats	--	--	--	--	Reported 1/85
Swift Ind. Pkg. Corp.	Des Moines, Iowa	Meat Packing	40,000(Exp.)	8.0	150	--	Completed 1/85

T

Thomas J. Lipton Co.	Suffolk, Va.	Instant tea	--	--	--	--	Reported 12/84
Tombstone Pizza	Sussex, Wis.	Frozen pizza	22,000(Exp.)	--	423	--	Construction 12/84
Tyson Foods	Green Forest, Ark.	Poultry products	Expansion	--	300	--	Completed 12/84

W

Weeks Dairy Foods	Concord, N.H.	Ice cream, milk	35,000(Exp.)	--	20	--	Completed 3/85
Welch Foods	North East, Pa.	Juice products	--	1.0	--	--	Reported 1/85
White Star Packing	Bronx, N.Y.	Processed meats	Expansion	--	25	--	Planning 3/85
Wilson Foods Co.	Marshall, Mo.	Sausage patties	Expansion	1.9	--	--	Construction 4/85
Worlds Finest Choc.	Chicago, Ill.	Chocolate	500,000	--	--	Davy McKee	Construction 6/85
Wyoming Res. & Prod.	Washakie, Wyo.	Meat packing	--	9.5	102	--	Planning 12/84

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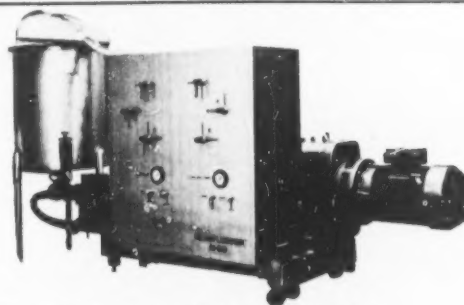
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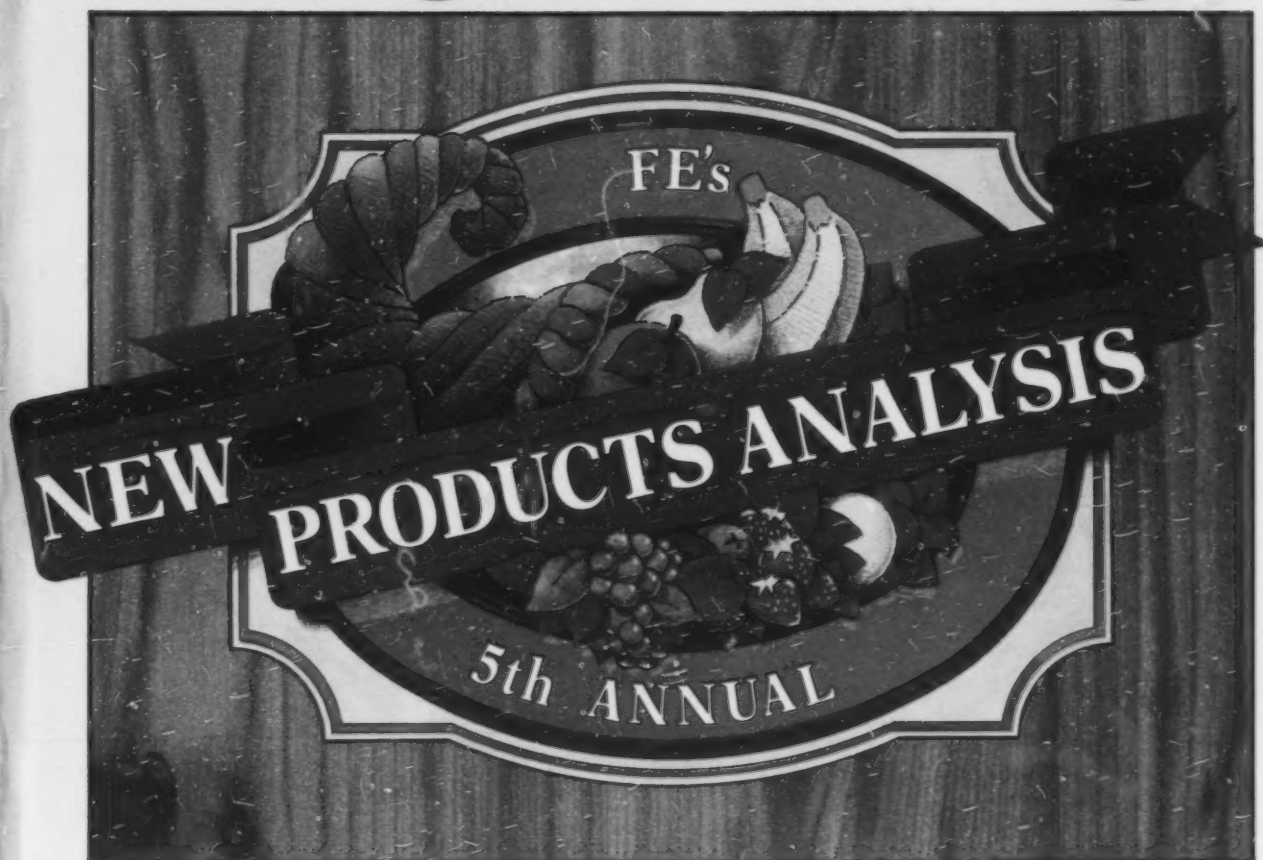
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OCTOBER 1985

Chilton's Food Engineering

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They bring their troubles to him

This Florida researcher specializes in tackling some of the food industry's toughest problems.

FDA's Action Plan

Is real change afoot for this industry regulator? Or is the new plan a paper tiger?

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ABOUT THE COVER

Food Engineering's annual New Products Analysis considers major new patterns and trends emerging in the highly competitive new products derby.

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CAMPBELL FROZEN FOODS BLITZ:

Through its subsidiaries, Campbell has launched a frozen foods campaign ranging from Mexican to croissants. **PAGE 30**

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Innovative new products flowed like water in 1983; "me-too" products were the rule in 1984. The major force in 1984-85 was not so much new products as the impact that mergers and acquisitions had on established food and beverage brands.

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Nothing is routine at ABC Research Corp., which specializes in solving problems across the entire spectrum of food technology. The 'Doctor' at this research specialization company attends to food industry.



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Small computer travels inside cans, bottles or retort pouches to give temperature reading from inside the can by recalling product core temperature.

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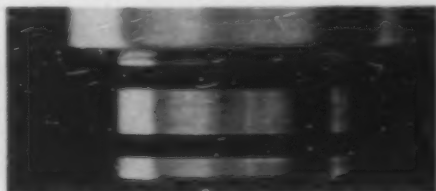
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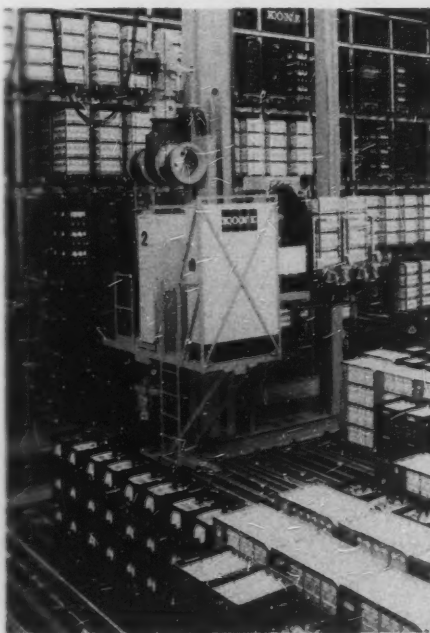
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COLD STORAGE SYSTEM: This computerized system has given a Dutch dairy one of the most streamlined food products handling system systems in Europe. **PAGE 104**



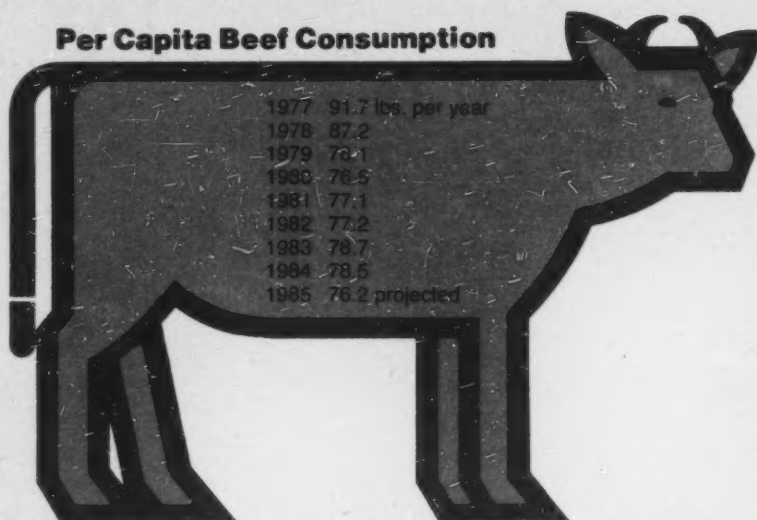
Special Emphasis

HANDLING & DISTRIBUTION EQUIPMENT:

Everything from laser guns to palletizers is featured in this month's special focus on Handling & Distribution equipment in this issue's new product section. **PAGES 99 TO 112**

Beating the meatpacker blues with value-added processing

Per Capita Beef Consumption



Precipitated by the steady decline in per capita beef consumption, the red meat industry is scrambling for alternatives. Down steadily since 1977, consumption is projected to hit a low of 76.2 lbs. this year.

Running shredded beef and seaweed extract through an extruder to get refabricated steak hardly sounds like part of a mainstream beef packing operation. But that's exactly what one major packer is doing and others may follow suit. You see, the red meat packing industry is in trouble. Competition from the poultry industry, resistance to high meat prices and public health concerns about red meat have led to a steady decline in beef consumption since the mid-70's.

A Federal Safety Inspection Service (FSIS) report indicates that firms in the red meat industry will have to move to higher value-added products, such as prepared frozen meat entrees, which have a greater profit margin, in order to increase profits. And some red meat packing firms are proceeding to do just that.

With a relatively low rate of return on sales (historically around 0.9 percent), meat packing firms depend on high volumes for survival. Per capita consumption of red meat is down.

Industry has responded by:

- Reducing payroll costs
- Moving operations closer to feedlots
- Increasing company size

FSIS says that in the future, the reme-

dies used by the red meat industry to maintain profit levels may not be sufficient. Payroll now only comprises 5.6 percent of value of shipments compared to almost 90 percent for the cost of raw materials and there is little indication that animal costs will or can be forced down. Most major firms have already relocated closer to the feedlots and existing technologies place a limit on the economies of scale that can be gained from increasing plant size.

Montfort's strategy

Montfort of Colorado, Inc. is testing the feasibility of manufacturing several types of value-added products. Besides refabricated steak, the company is also test-marketing a new line of "Montfort Gold" meats, including precooked London Broil that is ready to slice and heat, and ready-to-eat sliced pastrami and corn beef in small foil packages. Other developments progressing at Montfort's Hastings, Neb. processing plant include premixed meat loaf, barbecue sauces and shredded meats, targeted for the microwave oven market.

According to Kenneth Montfort, president, the beef industry has to develop high-quality convenient and healthful beef products in order to become sound

(Continued on pg. 26)

ACQUISITIONS SUMMARY

Safeway sells Australian interests

Agreement has been reached for the acquisition of Safeway's Australian interests by Woolworth's Limited. (no connection with the U.S. firm, F.W. Woolworth Co.) The agreement provides for Safeway to receive a 20 percent equity interest in Woolworths. At current market prices, this would place the value of Safeway's interest at more than 100 million U.S. dollars. Woolworths is the second largest retailer in Australia, operating more than 850 stores. Australia Safeway Limited has 124 stores in Victoria, New South Wales and Queensland with sales of over 850 million U.S. dollars. The merger will provide a high degree of compatibility and regional fit with very overlap.

MTX to acquire Huber Brewing Co.

Headed by William F. Smith, former CEO of Pabst Brewing Co., MTX, Inc., a recently formed Milwaukee-based holding company reached an agreement to acquire Jos Huber Brewing Co., a privately held firm based in Monroe, Wis. Huber's annual sales are an estimated 250,000 barrels, with Augsburger and a Huber brand as the top labels. Smith said MTX and Huber Brewing want to expand the product line outside the Midwest. U.S. distribution rights for imported beers will be sought.

Dean Foods expands through acquisition

Dean Foods has announced the acquisition of Bond Pickle Co. of Oconomowoc, Wis., and Ye Olde Tavern Cheese Co. Inc. of Chicago. Both acquisitions were for cash, with the prices withheld. The company says that the acquisition of Bond will increase Dean Foods' annual pickle sales to \$85 million. Chairman and CEO Kenneth Douglas says that sales of Ye Olde Tavern Cheese spreads can be "substantially increased" by marketing them with Dean's line.

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WILLIAM C. DRENNAN
Senior Editor

NEWS/CORPORATE STRATEGIES

(Continued from pg. 25)

again. Montfort of Colorado is the first major beef packer to produce convenience meats for retail meat counters. The company is also the beef packer that most resembles today's chicken corporations. Montfort has feedlots, packing plants, a processing and portioning plant and a distribution company.

The problem with product development in the beef industry is that it has to be a secondary strategy. Overcapacity and fierce competition have forced beef packers to concentrate on cost cutting measures just to survive. Montfort copes by attempting to produce new products without the benefit of market research or advertising budgets.

Another strategy that takes a back seat

to cost cutting is long-term research projects. "We have for 20 years borrowed most of our technology from the Europeans," says Dr. Burdette Breidenstein of the National Livestock & Meat Board, Chicago. According to Breidenstein, the shortfall in meat research in the U.S. can be attributed to widespread company takeovers and the installation of managers who do not understand the industry.

Hormel forms Deli Division

Geo. A. Hormel & Co., Austin, Minn., has long been involved in the processing end of the meat business. The company has announced an accelerated program designed to position the company as a full-line supplier of ready-to-serve specialty items to the delicatessen market.

A newly-named Deli Division, operating as part of the Meat Products Group, will replace the Dry Sausage Division. Efforts will be made to expand the deli line to include cheese and turkey products, fish and seafood, frozen entrees and related premium, specialty items.

Beatrice merges three meat divisions

In a cost-cutting move, the Refrigerated Food Group of Beatrice U.S. Food has merged three companies to form Beatrice Meats, Inc. Beatrice Meats' product line includes poultry and meat products from Swift & Co.; pre-packaged meat and deli products from Peter Erkrich and Sons; and corned beef products from E.W. Kneip, Inc.

The move provides Beatrice with a unified salesforce totalling 832 representatives, driver sales people, brokers and distributors. Beatrice will have a better shipping program with fewer trucks and less paperwork. Single invoice billing will represent multiple brands.

Coke refuses to disclose secret formula

Coca-Cola Co. is refusing to obey a federal pre-trial order to disclose its secret soft-drink formulas. In late August, U.S. District Judge Murray Schwartz had ordered Coke to release several soft drink formulas to representatives of forty bottlers who are fighting the company over syrup pricing. A lawyer for Coca-Cola said that disclosing the secret formula to the court, even under a stringent protective order, "would subject the Coca-Cola system to grave risks..."



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OCTOBER 1985

A Food Engineering Exclusive



Is the pace of new product development slowing? Sky-high promotion and marketing costs are making the business of new product roulette an expensive proposition. Food Engineering combs the 1984/85 product battlefield for the winners, the wounded, and the emerging forces.

Kevin Hannigan, Features Editor



Innovative new products flowed like water in 1983, but "me too" products were the rule in 1984. Actually, the major news in food marketing in 1984-85 was not so much new products as the many mergers that took place.

Is the current new-product boom over? It looks that way to many food marketers, some of whom are reconsidering the wisdom of the "new-product pipeline." Does it really have to be full all the time, flooding the marketplace with untested products that are expensive to produce, have no ready market and take up valuable shelf space? Or is it wiser to target your products where a need already exists?

Product ebb and flow

New food products are always with us. There will always be a large number of "new" products featuring label changes, formula changes, or additions of new flavors and colors.

"In 1984," reports Martin Friedman, editor of Dancer Fitzgerald Sample's *New Product News*, "we reported the introduction of 1,988 new 'traditional' supermarket products, an increase of 10.3% over 1983's level. When you add in all the different flavors, colors and varieties, the aggregate total was over 7,000 new food and non-food items out there trying to

win the shopper's attention. And, so far in 1985, the high percentage increases continue."

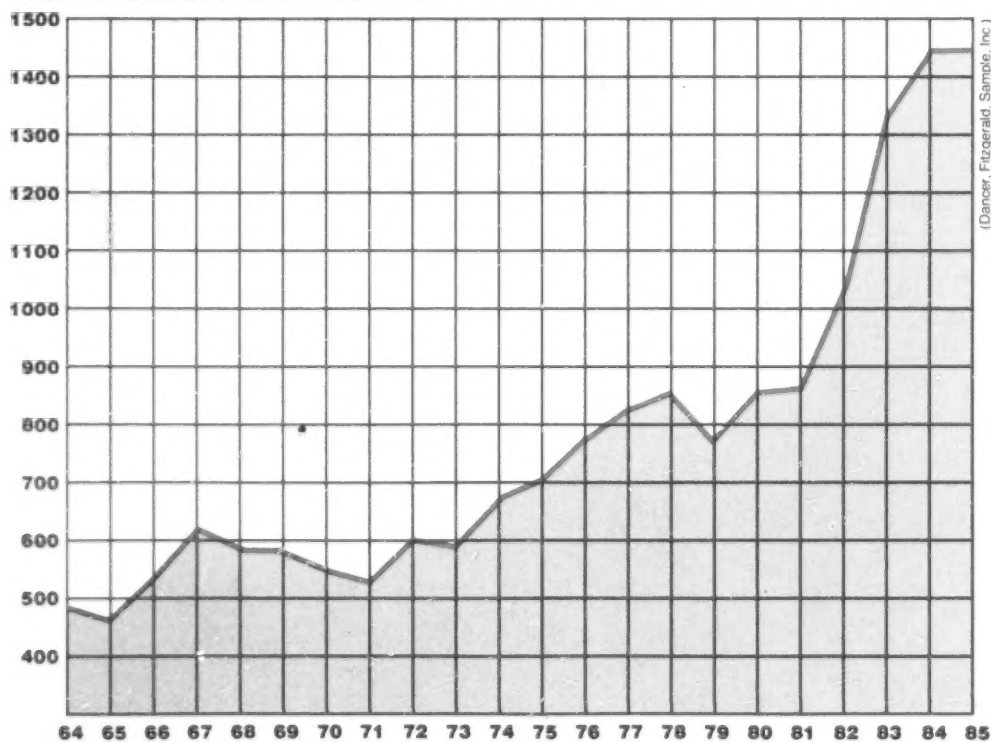
Truly innovative new products are another story. When something is *really* different, it changes the market. And it almost always reflects a major change in packaging, food science, processing technology or a shift in thinking for the society as a whole. All of these factors, and more, have had a part in shaping our current food marketplace. And the waves of change continue to spur new developments.

New product trend waves seem to be an evolutionary phenomenon, caused partly by industry "push" and partly by marketplace "pull." And, like all waves, there's a downside. Periodically, the market corrects itself, shaking out new products which don't measure up and older products which are no longer needed. We may be in a "shake-out" period now.

This ebb and flow of new products is so regular (note chart, page 66) that there appears to be a "new-product cycle" which peaks about every 5-6 years. Since 1984 was a "peak" year, new product introductions may stabilize for a year or two, and even decline slightly before surging to a new high about 1990. Considering the glut of new products in some categories, usually imitating sales leaders, this plateauing

The number of new products introduced each year has gone up, up, up for the past two decades. But you'll notice that the curve peaks every 5-6 years as the market corrects itself.

New Product Flow: 1964-1984



seems reasonable, even predictable.

Balancing this "normal plateau" scenario is the possibility that the curve will continue to jump off the chart. Methods of distribution are still open to change, as was proven by the success of *California Cooler*. High-barrier plastics, and new developments in glass and metal containers, are boosting sales of condiments. A host of new ingredients—some of them products of biotechnology—will have a major effect on food products over the next five years. And new technology, such as extrusion cooking, is changing the way we process foods.

There's another variable to consider, too. The food industry is a melange of nearly a dozen separate industries, some of which are growing and some of which are not. Most of the radically different new items have come from industry subsegments which were once stagnant and are now growing. It's almost certain that some of the currently stagnant segments will startle us with new product concepts in the near future.

And then, the curve will soar again.

The consumer connection

In the near future, predicts Campbell CEO Gordon McGovern, ethnic and regional foods will do extremely well. Consumers will vote for chicken and fish with lighter breading and fresh new tastes. And fruit juices, such as Campbell's *JuiceWorks*, will continue to be favored by school children and their families.

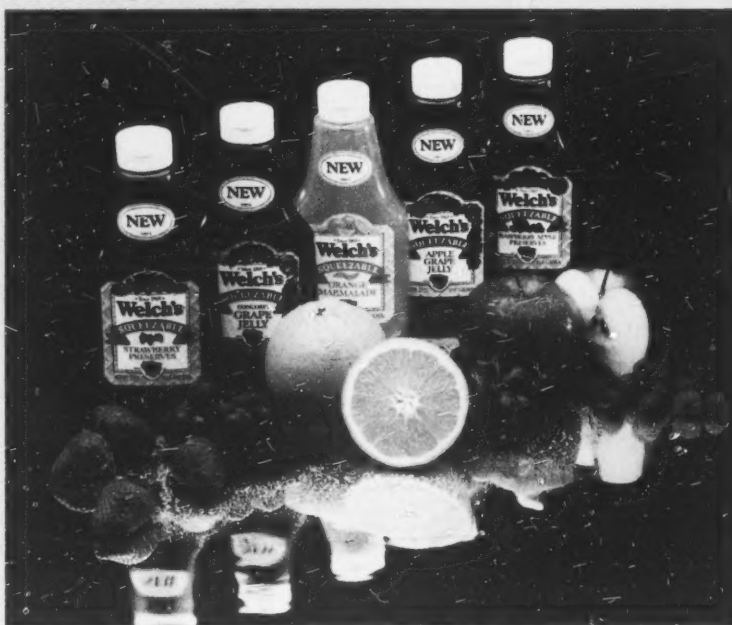
"There are two trends here," says McGovern. "One is a new sophistication in U.S. tastes and food preferences. The other is towards convenience. Take a look at microwave oven sales and you can see it. The handwriting is on the freezer, you might say. We noticed it and *Le Menu* proved us right. Now, we're making all of our frozen products microwaveable."

That's target marketing, fitting the product to the consumer. The potential consumer can be isolated into regional and ethnic groups, or defined by age, sex, income and marital status. But reaching these groups with a new food product they'll buy is not always easy. First, you have to identify their needs.

All broad product trends are connected via the consumer. And they cut across product lines. Thus, the trend to natural foods has led to real fruit being added to everything from cookies to croissants. The consumer connection makes waves, and products in many categories are moving forward on those waves.

A current example of this truth, notes Martin Friedman, is the movement of successful fast-food outlet products into supermarkets. The flow includes: *Banquet Hot 'n Spicy Chicken*; *Weaver Chicken Nuggets*; *Tyson Chicken Patties*; *ConAgra Entree Express*; *Micro Magic Potatoes*; *Ore-Ida Lites*; *Heinz Steakwich*; *Pillsbury*

Microwave Pizza; *Benihana Entrees*; *Swanson Great Start Sandwiches*; *Sara Lee Le San*Wich*; *Campbell Fresh Chef Salads*; and *Oscar Mayer Stuffin' Burgers*. "We're going to see a speed-up in this trend," predicts Friedman. "As soon as you read about a new fast-food success, you'll see a similar product in stores in six months."



This "crossover" effect works both ways. With 40% of consumers changing their eating habits because of nutritional concerns, the National Restaurant Association's *NRA News* reports that lighter, healthier and more nutritious foods and beverages are among the fastest-growing menu items in America. Specifically, decaffeinated coffee, fruit as a side dish, diet colas, and main dish salads are soaring.

In packaged products, this interest in health and nutrition has spurred sales of light and low-alcohol beers, wine coolers, and now pre-mixed cocktails. There's also a shift away from shortenings to vegetable oils, from saccharin to aspartame, from candy to fruit snacks, etc.

New product trends that may affect the market in the future already are apparent. For example, the interest in spicy, ethnic and tropical products may result in a series of foods with a Cuban or Puerto Rican flavor. The interest in finger foods, natural products and extruded items may produce new coated fruit snacks to compete with candy. And the emphasis on foods that improve health may lead to acid-control products for those with ulcers, and calcium-enriched products for older women.

On the following pages, *Food Engineering* attempts to identify and explain some of the broad trends affecting the food market today, and to suggest what the future might hold.

One factor in new product development is revolutionary new packaging, such as these plastic squeeze bottles used for Welch's jellies.

(Continued on page 70)



Broad new-product trends tend to reflect consumer desires. Currently, consumers demand high-quality foods and greater convenience in home preparation. Increasingly, food preparation takes place in today's food plants—not in the kitchen. Many U.S. kitchens are today designed and outfitted for "heat-and-serve" preparation. But while consumers may be spending less time on food preparation, they are demanding even more in the way of quality. Convenience and quality: these are the engines of change in today's food development picture.

The food industry's response to these demands has been dramatic and prolific. The last 5-6 years have seen an unprecedented outpouring of new foods and beverages. At the same time, the dual demands of quality and convenience affords U.S. processors enormous opportunity for value-added manufacturing. The more manufacturing and preparation time devoted to a product, the more premium the price and, potentially, the more premium the margin.

Within this general pattern, *Food Engineering* has sought out trends within the various segments of the food business over the past 18 months. Here are some key developments.

BAKERY: A QUALITY TOUCH

A slow-growing population, along with concerns for health and nutrition, should suggest modest gains for bakery treats. Yet, soft and

chewy cookies are one of the most successful new product types to hit the stores in the past two years. P&G's *Duncan Hines* line, Nabisco's *Almost Home* and Keebler's *Soft Batch* cookies are all successful. And Keebler has even followed up its success with regular *Soft Batch* cookies by adding a chocolate-enrobed version.

"Healthy" foods may be a fading trend. *Weight Watchers Bread* arrived last year, but it was one of the few new products offering nutritional benefits. Rumors of fiber-enriched variety breads, cookies and crackers persist, but none have impacted on the market. Has the public's concern for nutrition really ebbed, or does it want something a little more exciting than "plain and wholesome" foods?

Chances are, it's the latter case. Where consumers can choose between plain and fancy foods, they're choosing fancy. One result of this choice is that white bread rolls and sweet baked goods increased last year, while bagel sales fell and white bread lost ground to specialty breads and upscale baked items. Cookies did significantly better, and cracker sales rose even faster.

The move is toward higher-quality baked items, the equivalent of gourmet foods. An example is *Pepperidge Farm Mustard Bran Bread*, which may or may not succeed. Where the consumer's desires can be tied to another current trend, though, such as convenience, sales are up. French toast, for instance, disguised as a gourmet "Monte Cristo" sandwich,



Campbell rationalizes new-product effort

Campbell Soup Company is fine tuning its new product pipeline to be more cost effective and more profitable. Extremely active in introducing new products during the past five years, the firm leads the "Top 20 Food Marketers" list with 334 flavors or varieties—averaging 1.3 new items every week over the five-year period. Some of these have been very successful, primarily *Prego Spaghetti Sauce* and *Le Menu Frozen Dinners*, and future Campbell winners may include refrigerated salads, microwaveable soups, *Pepperidge Farm* ice cream and granola bars.

But it's also true that Campbell's profits dropped 5% for the fourth quarter ended July 28, its second consecutive quarterly decline. Net income for the quarter was \$39.4 million, down from \$41.6 million. Yet sales were \$906.6 million, up from \$838 million a year ago.

The past is a lesson to be learned, they say. And Campbell has learned that its new product program is expensive, especially those new products which require totally different production facilities. Thus, the firm's president, R. Gordon McGovern, has laid down The Law.

In future, Campbell will control costs more rigidly, and will concentrate on those new items with the greatest chance of success. The steady flow of new products will continue, but the cost of introduction will be rationalized to reduce the risk. And to minimize production costs, many items will be "spinoffs" from current successful products.

First, Campbell is jumping into the \$430-million dry-soup category—estimated to account for about 26% of total soup sales—with *Campbell's Quality Soup and Recipe Mixes*, a 6-item line of "natural" products made without preservatives or artificial flavors. Meanwhile, Campbell is expanding distribution of its *Home Cookin'* line, an upscale version of its *Chunky Soups*. And two new varieties—*Chunky Fisherman's Chowder* and *Chunky New England Clam Chowder*—have been added to the latter line. The firm also has gone national with *Gold Label Creamy Natural Soups*, a series of premium products you'd expect to find only in restaurants.

is a newly popular fast-food item.

Snack cakes are doing well, too. The consumer's sweet tooth is back, and all kinds of confections are doing better. One brand-new product from Pillsbury is *Pudding Pockets*, cupcakes with pudding centers, an updated version of cream-filled cupcakes. And Tasty Baking Co. has gone into vending packs of small doughnuts—even building a complete doughnut plant inside its main facility.

CROISSANTS, CAKES

Croissants are the hottest trend in baked goods. Now a \$700-million business, thanks to *Sara Lee Croissants*, they're multiplying as fast as new variations can be developed. Local and regional bakers who deliver fresh to stores have joined the croissant crusade, too. Most of the new products combine the elements that are needed for success in 1985-86, but the best way to succeed is to know your market.

At Pepperidge Farm, all new product efforts are aimed at addressing consumer needs. Leading the list are new *Petite Croissants*, smaller-portion items for breakfast or lunch which also double as dinner rolls. "They're equally at home with a soup or salad," says Craig Rydin, frozen foods marketing director.

Pepperidge Farm, which claims a 23% share of frozen sweet goods sales, is changing to stay ahead. "Sales of *Iced Cakes* are up 20% and *Old Fashioned Muffins* now hold 96% of the market," says Rydin. "That's the kind of lead we like." In *Iced Dessert Cakes*, the firm has over 50% of the market; in turnovers and breakfast muffins, it is the market.

Cholesterol Free Pound Cake and *Single Serving Desserts* are other new PF products expected to have wide acceptance. The new pound cake, formulated with the "health" segment in mind, is a rich-tasting, golden cake made with margarine and a cholesterol-free egg substitute. "It's not a 'diet cake' per se," says Rydin, "but it's specially prepared for consumers who are sensitive to cholesterol intake."

Innovative new products such as these should do well in 1985-86 as the total market for bakery items grows about 2.7%. Growth should range from 2.1% for bread and related products to more than 4.5% for cookies and crackers. And the hottest new trend may be high-fiber breads, cookies and crackers—if the moisture problem can be solved.

The trouble with regular fiber-enriched cookies, says Allen Morrison, export marketing manager for Canadian Harvest, is that they absorb too much moisture, and "sort of swell up." Morrison's firm offers a wide variety of fiber products for use in foods, and even blends these products to solve specific problems. So,

now, his firm is working on a sandwich snack with fiber, flavor, sugar, etc. in the middle and regular crackers on the outside. If there's any "swelling," it'll just make the flavored filling larger, not the crackers.

BEER: MATURE MARKET

Alcoholic beverages in general have done well in the past two years, but there are signs weakness. Beer sales are flat, according to Business Trend Analysts. The brewing industry is in a long-term decline, and it could get worse.

Young adults drink more than half the beer sold in the U.S. But they'll drink more wine and liquor—and less beer—as they age. Meanwhile, society is working against brewers, too. The drinking age is being raised again, public drinking is actively discouraged, and the campaign to reduce drunk driving has eliminated "Happy Hour" in many places. More importantly, however, beer consumption will slow because fewer persons were born between 1965 and 1980, so fewer are coming of age.

New products entering this declining market shouldn't expect to do very well. Yet, says BTA, there's been a flood of new products as brewers race to establish an entry in each category of an increasingly segmented market.

Light beers and low-alcohol beers led this surge, with mixed results. Sales of light beer are

(Continued on next page)

New Product Leaders—1980 to 1984

	1980	1981	1982	1983	1984	Total
Campbell Soup	54	21	77	90	92	334
Nestle	86	59	52	33	63	293
General Foods	41	59	42	49	88	279
Beatrice	20	48	49	79	38	234
Dart & Kraft	28	28	48	22	80	206
Consolidated Foods	32	48	41	20	49	190
Lever/Lipton	29	13	35	72	41	190
Pillsbury	35	25	32	43	53	188
General Mills	26	26	47	25	51	175
H. J. Heinz	32	26	34	27	51	170
Borden	15	25	44	35	47	166
IC Industries	7	19	30	28	57	141
Nabisco Brands	32	18	13	44	33	140
R. J. Reynolds	40	14	10	29	32	125
Quaker Oats	19	17	21	39	20	116
ConAgra	29	12	21	33	19	114
Ralston-Purina	13	15	16	15	38	97
Kellogg	7	20	22	18	11	78
Coca-Cola	11	5	19	10	12	57
Pepsi-Cola	4	7	10	27	1	49
Totals	560	505	663	738	876	3,342

(Source: Dancer Fitzgerald Sample New Product News)



plateauing, and low-alcohol beers may soon be just a memory as more and more young drinkers opt for the status of wine coolers.

Premium beers (*Budweiser*, *High Life*, etc.)—the largest segment of the beer market—were hit hardest by the “light brigade” and should continue to decline 2% annually through 1993. But superpremiums (*Michelob*, *Lowenbrau*, etc.) could grow 6% per year. These superpremiums will have to fight off the imports, however, which are taking most of the growth in the higher-priced end of the market.

Popular-priced beers (e.g., *Old Milwaukee*, *Hamm's*, *Blatz*, *Iron City*, etc.) showed unexpected strength during the recent recession. This previously “dying” category has been revitalized with new products, principally *Stroh's Old Milwaukee*. But as consumer incomes rise, volume in this category should erode.

The future for U.S. brewers is still bright. The market should boil down to mainly high- and low-priced beers, with imports continuing to gain. During this period of relative stability, however, expect to see brewers moving considerable sums of their investment into new areas of competition where their marketing expertise can provide an instant advantage. One example is Anheuser-Busch's foray into theme parks and—with its new *Budweiser Eagle Snacks*—the packaged foods industry.

Light beers will continue to do well, making up more than one-third of all U.S. beer consumption by the early 1990s. This success will draw even more entries into the market, but the leaders will remain *Miller Lite* and *Bud Light*. Most of these new light beers should find rapid market acceptance, followed by slow, steady sales gains. That was the case with *Coors Light*, *Stroh Light*, and *Lone Star Light*.

Potential for Wine Coolers: 1985—1990

Year	Cases (millions) growth	\$ Value (millions) growth
1985	29	\$261
1986	44	\$360
1987	65	\$488
1988	83	\$623
1989	96	\$744
1990	105	\$814

(Source: FIND/SVP)

WINE: UPSCALE CHOICE

Since drinking has become less of a social/recreational affair and more of a status symbol, expect to see more drinking at home and in upscale restaurants, but much less at bars, beaches and ballparks. Expect also that brewers will try to follow its primary target market—the baby boomers—as they age and change.

This aging of America implies a shift away from beer and toward other alcoholic beverages. As we grow older, we increasingly prefer wine and distilled spirits over beer. According to *Food Industry Futures*, most at-home drinking is done by the 45-54 age group. And older singles spend almost three times as much for wine at home as youngsters.

Americans are drinking more wine these days, but *all* of the increase is in wine coolers. Dessert and table wines have been declining for years, mainly because only about 40% of U.S.

adults drink wine. And half of that is consumed by women. So most of the new table and dessert wine products are aimed at this group. The trend is to new and more convenient packaging, and greater variety—wines for every occasion.

As more women become full-time workers (MRCA Information Services says it's more than 50% now, and should reach 60% by 1995), wine consumption should increase. Then, more families will have two or more wage earners—and more discretionary income.

Since women drink mostly wine, and men drink mostly beer, and both like a cocktail now and then, what do they drink when they're at home together? To solve this problem, and attract more young drinkers, distillers are developing new “lighter,” prepackaged cocktails that make drinking more pleasurable. *Jim Beam and Cola* was an early indication of this new trend. A premixed gin & tonic (using *Beefeater* gin) being tested in Boston is another. The idea is to identify the brand of gin with the mixed drink. Now, it's likely that “Rum & Coke” will become “Bacardi & Coke.”

There's a marketing trend here worth noting. The newer wine coolers are identified with major brand names (Seagram's, Schenley, etc.) and get a free ride on the major label's status. And the more-successful light beer entries in recent years—such as *Old Milwaukee Light*, *Hamm's Special Light* and, surprisingly, *Iron City Light*—also have been linked by name to well-known popular-priced brands.

DAIRY: MIXED RESULTS

In the past, the dairy industry has slumped during recessions and boomed in good times. But, from the industry's current performance, it would be hard to tell what the economy's doing. Current major gainers are premium ice creams, sherbets and other frozen novelties, and specialty cheeses. On the strength of these, dairy product consumption, down about 7.5% since 1978, edged up slightly in 1984. But the rise was not uniform. Producer prices for all dairy goods rose 0.5%, with ice cream and frozen desserts gaining 2.0% while processed cheese dropped 4.1%. Consumer prices for all dairy products advanced 0.6%.

There are five major sectors to the dairy industry—butter, natural and processed cheese, condensed and evaporated milk, ice cream and frozen desserts, and fluid milk—and not all of them did well. Cheese scored the greatest estimated rise, while fluid milk shipments declined slightly. Per capita consumption of fluid milk is down somewhat, with whole milk the biggest loser. Low-fat milk increased from nearly 25% to nearly 33%. But skim milk consumption has been nearly constant, while flavored milk, light

cream and buttermilk have declined.

Big winners for dairy firms are premium ice creams and frozen novelties. MRCA reports that frozen novelties now penetrate 41% of U.S. homes (compared to 89% by ice cream/milk) and rank above most frozen sweets. Eaten mostly as a snack, they outnumber frozen desserts by 3:1. Even so, many novelty items showing a strong dessert orientation—such as chocolate-covered ice cream bars, home-assembled ice cream cones and frozen juice bars—have had the most growth. Eatings of chocolate-covered ice cream bars, which had the strongest dessert orientation (31%) of all the novelties, increased 45% in 1983-84.

Much of the growth in the overall novelty category, says MRCA, can be attributed to the introduction of several new specialties. In 1984 these items, including pudding bars, gelatin bars and juice bars, penetrated 10.3% of U.S. households. Pudding bars were the leader in penetration with a level of 6.7%, compared to gelatin bars' 1.8% and juice bars' 2.8%. Gelatin bars showed the most growth, though, with 1984 eatings up 344% over the 1983 level.

Premium ice cream is a major all-round growth area. A National Restaurant Association survey last Spring showed that 24% of all respondents (44 million adults) planned to visit an establishment offering premium, hand-dipped ice cream in the near future. In fact, premium ice cream ranked Number One in consumer interest on a list of 15 new restaurant concepts being checked out by NRA.

Of course, a horde of food companies have invaded the more-than-\$1.5-billion ice cream business, mostly by acquisition. The latest is Pepperidge Farm, which is marketing nine distinctive ice cream flavors in New England. PF's ice cream, sold in both pints and quarts, reportedly "has the creamy, rich-taste of homemade ice cream in flavors from butter pecan to chocolate brownie."

Cheese products are on the rise, too. A report by Frost & Sullivan says that Americans will eat 30% more cheese by 1988 as eating habits shift toward snacks, ethnic foods such as Mexican, and fast foods such as pizza. All told, more than \$11 billion worth of cheese will be consumed in 1988 compared to less than \$8.8 billion in 1984, producing faster growth than any other dairy product.

Moreover, says F&S, the total market for cheese, yogurt, ice creams and frozen desserts will jump 24%, from \$13.6 billion in 1984 to \$17 billion in 1988. Yogurt consumption, helped by the fitness trend, is now more than 2.7 pounds per capita and increasing 5% a year. And the interest in premium and super-premium ice creams is bringing increases of about 15% a year. Ice cream and frozen desserts in

(Continued on next page)

Wine coolers hot

We're drinking more wine these days, and most of the increase is due to wine coolers. Collectively, Americans drank 50% more wine in 1984 than they did in 1975. But, since 1980, this category's growth rate (4-5%/year) has slowed considerably. In fact, without wine coolers, wine consumption would have fallen last year.

In 1984, says FIND/SVP, The Information Clearing House, about 10.5 million cases of coolers were sold, bringing \$220 million at retail—more than four times the 1983 figure. And the category is still growing. Today, it's worth about \$333 million.

These sweetened, carbonated beverages—usually a blend of low-cost wine and fruit juice—contain 3-7% alcohol. Most (49%) are citrus blends, and most (70%) contain white wine. Generally, they're 4-packed in green glass bottles.

And they're successful; you can tell by the gush of new products. The chief reason for this success is the method of distribution. Consumers can find their coolers at supermarkets and convenience stores, right next to beer and soft drinks.

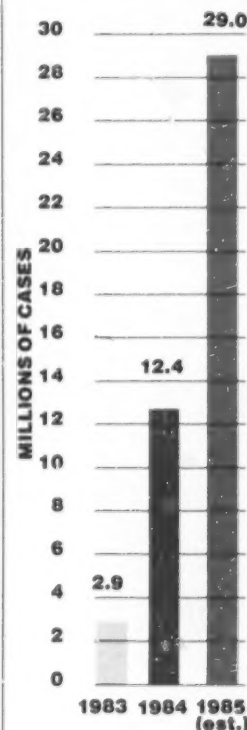
California Cooler pioneered this form of distribution and owns 55-60% of the cooler market. Canandaigua's *Sun Country Cooler* and Steidl's cooler tied for second with about 10% each. Those figures may change, however. About 40 new brands were added in the 18 months covered by this report, many of them positioned to cut the market into narrower slices. Adolph Coors Co.'s *Colorado Chiller*, a malt-based beverage, falls between beer and wine in the marketing spectrum. And Schenley's *Dubonnet Splash* fits between coolers and blush wines.

Furthermore, as volume grows, so does the competition. Brown-Forman is in the market now, having acquired *California Cooler*. With Joseph E. Seagram & Sons (*Seagram's Wine Cooler*) and Gallo (*Bartles & James*) joining the battle, cooler bottlers will need plenty of advertising money just to survive. A shakeout is coming, and fewer brands will cut the pie in the future.

Even so, there's tremendous potential for wine coolers if they can cut deeper into the beverage market. In 1983, coolers held only .03% of the beverage market in terms of gallons sold at wholesale. A 1% shift in beer consumption for that year would have boosted wine cooler consumption 880%. And a 1% shift in soft drink sales would have raised cooler sales more than 1000%.



Wine Cooler Shipments



(Source: FIND/SVP, The Information Clearing House)



total are growing more slowly than other product categories, however, and will increase about 13% in total value between 1984 and 1988, from almost \$3.9 billion to nearly \$4.4 billion.

CONFECTIONS: SWEETER

Trends in confections are confused, but it's clear that the consumer's sweet tooth is back. And the sweetest sweet teeth belong to the 18-34 year old group, who are eating about 35% more candy than in the past. In 1984, U.S. consumers had boosted per capita candy consumption to 18.2 pounds—not bad, but still far short of the 24-25 pounds common in some European countries.

A major trend in candy packaging seems to be the pouch, replacing small paperboard cartons for piece candies. At the same time, we might note, the pouch is being used for snack products that compete directly with candies, such as Del Monte's new fruit bit mixture.

In the U.S., people are concerned about health and fitness, about dental caries and sugar, yet are eating more chocolate. It's likely that stable prices and the concept of "pure" or "real" chocolate helps to sell many confections. There's also the suspicion that consumers are ready to pamper themselves again.

"The market is growing," reports Kenneth L. Wolfe, President of Hershey Chocolate Company; "and we're planning to capture a bigger piece of it through new products, new pack types and line extensions, and the continued growth of our established brands." Hershey owns about 36% of chocolate confectionery sales, says Wolfe. He notes that, 20 years ago, 80% of Hershey's sales came from products containing 70% or more chocolate. More recently, that number has dropped to approximately 45% on a substantially larger sales base.

"Ten years ago, less than 1% of our sales came from products less than five years old. During the last five years, new products have contributed 10-20% of an ever-increasing sales base. And they've been very important to the diversification of our product line. Said another way, *new products have helped us lessen our dependence on cocoa beans.*"

With a sharp eye on the consumer trend to higher quality items, Hershey is continuing its positive growth trend with an emphasis on premium confectionery products. Building on the success of its *Golden Almond* chocolate bar, for instance, the firm rolled out *Golden Almond Solitaires* during the latter part of 1984.

The *Solitaires* are individual chocolate-covered almonds packed in a 3.2-ounce, single-serving gold foil pouch. Other premium chocolates recently introduced by Hershey include the *Golden Pecan* chocolate bar and *Marabou*

Milk Chocolate Roll (imported from the Company's Scandinavian affiliate, A B Marabou), both of which went national in 1984.

As Hershey's product strategy suggests, consumers are ready to accept chocolate products that are *not all* chocolate. In fact, throughout the marketplace, there has been uniform acceptance of cookies, wafers, extruded bars, etc., with a chocolate coating. *Kit Kat* and *Twix* are just two of the more-popular items to come to mind. Both seem to have attracted older, denture-wearing consumers who would normally refuse to buy hard or chewy candies.

To some product developers, this adventurous spirit on the part of consumers could open the door to entire new lines of products, or even greater diversification. They expect the role of texture, for example, to become even more important in U.S. foods. The newer laminated confections, crunch bars and granola bars have done well, so why not a different-textured chocolate bar. A single product, they say, could come in various textures just as we now have various flavors of hard candies. This concept may be worth watching.

ASPARTAME: ITS IMPACT

The market for sugar and corn sweeteners won't get much stronger than it is right now. The market was estimated at \$5.7 million in 1984, and should grow 3.1% to \$6.66 million by 1989. Growth in the 1989-94 period, however, is projected at only 1.4%, to reach a total of \$7.15 million. For the first five years (1984-89), the 3.1% growth rate will result from the heavy impact of non-caloric sweeteners. The drop isn't likely to continue at the 1.4% rate, though, unless there's a tremendous drop in the price of these sugar alternatives.

Meanwhile, *Business Trend Analysts* predicts that non-nutritive sweetener sales—aspartame and saccharin—will be \$785 million in 1995. They aren't doing badly now, either.

Aspartame, as Searle's *NutraSweet*, is becoming well known to consumers. A total of 37 companies are now offering retail products containing aspartame, reports a Nielsen study. Nielsen found that, by the end of 1984, about 66 brands had been introduced that contained aspartame. This included both reformulated existing brands (the majority) and several completely new brand names. These brands had been introduced into a total of 18 categories, the majority of these having been hot and cold beverage categories such as carbonated beverages, powdered soft drinks, hot cocoa mix, etc.

How many of those aspartame products had an impact on the market in 1984? To answer that question, Nielsen chose three categories to study, using data from the *Nielsen Food Index*

The impact of aspartame on powdered soft drinks

Category	Volume gain/loss		Share of sales	
	Jan. '85	Jan. '83	Jan. '84	Jan. '85
Presweet'd soft drinks	-3%	—	—	—
Sugar-based	-21%	97%	65%	51%
Aspartame	+34%	3%	35%	49%
Total	-1%	100%	100%	100%

(Source: Nielsen Food Index)

Service. Sales were monitored nationwide to determine the effect of aspartame-based products on table-top sweeteners, powdered soft drinks and carbonated beverages.

In table-top sweeteners, aspartame-based products continued to do well in their second year. Over a 4-month period, both dollar and serving sales volume increased more than 40%. Category sales also continue to increase, although not quite as dramatically.

Interestingly, says Nielsen, sales of table-top sweeteners containing saccharin haven't declined as much as might be expected. There appears to be two reasons. First, the aspartame items attracted new consumers, those who were former sugar users and those who were not using a sugar substitute because they didn't like the taste. Meanwhile, those consumers who did not mind the saccharin taste remained loyal to their brands. Secondly, price appears to be a factor in keeping current saccharin users from moving to aspartame. The average price per serving for aspartame products has remained nearly 4½ times that of saccharin items.

In the powdered soft drink category (see table, page 75), overall category sales were not quite as strong in the 10-month period ending January 1985 as they had been the previous year, when most of the aspartame-based brands were introduced. In the most-recent 10-month period, sales of aspartame-based presweetened products grew slightly more than one-third over year-earlier levels, while sales of sugar-based presweetened brands continued to slow.

Aspartame-based products now have 54% of presweetened powdered soft drink dollar sales, and 49% of serving sales. And these products continue to maintain a price differential 21% higher than presweetened sugar-based items, proving that consumers know what they want and are willing to pay for it.

Finally, in the carbonated beverage category, reports Nielsen, there was a surprise. Trends for this category are different than those for table-top sweeteners and/or powdered soft drinks. The latter two items had a sharp increase in

sales during the first year, and then a sales slowdown during the second year. With carbonated beverages, that was not the case.

Total carbonated beverage sales have remained stable since the introduction of aspartame into diet-sodas. There were no sharp increases in sales, as in other categories. And carbonated diet sodas continued to outperform regular sugar-based soft drinks—as it had done just prior to the aspartame-blend explosion.

More recently, the continuing popularity of aspartame with consumers has prompted all of the major soft drink bottlers to offer 100%-aspartame formulations in spite of higher ingredient costs. This, in turn, should expose an even greater number of consumers to the aspartame taste. And those who like it, Nielsen says, will begin to hunt for aspartame in other categories.

MEAT: FOR THE AGES

Age, income and geography help to determine the amount and type of meat, fish and poultry products consumers buy. The U.S. population is aging. And as we age, it seems, we spend more without consuming more. We're more likely to pamper ourselves where it counts, in higher quality food and drink. And that's certainly true with meats.

At home, says *Food Industry Futures*, older folks spend twice as much on meat, and nearly four times as much on beef roasts. They spend half again as much as "youngsters" on poultry and seafood. The only meat category in which the under-35 group spend more than the oldsters is in "mutton, goat and game."

Yet, red meat consumption is down 6% since 1970. That's still a lot of red meat, and people still eat more than they did 20 years ago, but the curve is still trending downward. And it's true for both raw and processed meats.

Flat prices and soft demand continue to plague the processed meats industry, reports Business Trend Analysts, but sales should pick up a bit in 1985-86. The "health" trend is part of the problem, impacting heavily on the industry's product mix. Low-fat, low-calorie, and salt-free products dominated the list of new processed meat products introduced during 1984-85, says BTA. New items included Raiston's *Tenderlean*, Hormel's *Light 'n Lean Ham*, Beatrice's *Lean Supreme*; and Holton's *Lean & Low Beef Patties*.

On the upside, meat snacks continued strong during 1984, with dollar volume rising 11.4%. Sales of beef jerky and sausage sticks were particularly strong. Fresh sausage products, especially pork sausage, also remain a growth segment. Per capita consumption is up from 3.7 pounds to 4.9 pounds during the last decade, and a record 1.16 billion pounds of fresh sau-

(Continued on page 78)



sage was produced in 1984, with dollar sales reaching \$1.42 billion.

On the downside, sales of imported canned hams increased slightly over 1983 levels, but were still well under the peak levels of the late 1970s. Sliced bacon consumption has leveled off at 6.1 pounds per capita per year. Slab bacon is a no-growth area, too. In the short term, says BTA, growth for bacon products will be limited to commercial and institutional markets.

Notice that most of the growth is in composition meats, as opposed to meat cuts. That reflects what some see as a major change in U.S. diets—a shift away from “solids” to “semi-solids and liquids.” Chicken nuggets and sausage fall into this class, as food products where the composition can be controlled in terms of fat and cholesterol. It’s also a way to control costs, by combining meat with a lower-cost filler as in *Hormel’s Frank ‘n Stuff*.

Another hope for processed meats is the surge of higher-quality sauces, soups, etc. Adding a little more ground beef to a major spaghetti sauce would use up an awful lot of beef. Products for foodservice might be improved, too. Restaurants serve fewer red meat products these days, but they’re serving more poultry, fish and seafood. And vended foods, which last year grew 23.5% to account for 38% of all vending volume, is another potential growth area—for finger foods such as meat sticks, etc.

As sharp marketers have noticed, sales of finger foods are up more than 19%. To capitalize on this grazing trend, Campbell’s Swanson Frozen Food Division is introducing single-serving chicken portions for take-out in convenience stores with microwave ovens. Presently, 65% of all convenience stores have microwave ovens and the rest should follow suit soon.

Another area of potential profit is mid-level restaurants—particularly bars that serve hot food. These native eateries have upgraded their

menus in recent years with the addition of higher-quality steaks that are simply heated and served. Adding another prepared meat item, such as barbecued ribs or breaded pork chops, would help the industry. The current boom in breakfast sandwiches should help, too.

The popularity of finger foods and fast-food breakfast items is a result of consumers’ growing need for convenience. Breakfast sandwiches rank as the third fastest-growing menu item in the U.S., says NRA, with 39% more consumers ordering them now than in 1984.

SEAFOOD: A GOOD CATCH

The trend toward lighter, restaurant-quality food has boosted sales of both fresh and frozen seafood products. Sales and per capita consumption of both have increased faster than the industry average, and now represent about 62% of all seafood consumed in the U.S. The segment’s gains are due, in part, to growth in the fillets and steaks category, where consumption has risen to a record 2.86 pounds per capita.

Frozen items dominate the retail and institutional markets, but fresh seafoods have been catching up. Indeed, says BTA, the frozen products group has experienced sluggish sales in recent years, due in part to the recession and the growing demand for high quality, fresh seafoods. Leading frozen retail brands have recognized this trend and shifted away from heavily coated sticks and portions to raw frozen fillets and higher-value-added products.

Meanwhile, canned and smoked products are suffering, although canned seafood soups appear to be a new product with potential. Canned tuna and salmon have been hurt both by rapid price rises and the shift to fresh product. Tuna’s reputation as a weight-control food may forestall a continued decline, and product variations may even push sales upward, but the long-term picture for domestic tuna production isn’t good. Consumption of salmon might grow over the next decade, perhaps by as much as 1.2% per year, but most of that growth will be in fresh or frozen salmon items.

Smoked, pickled and dried seafood are hurt by both the trend to fresh product and the consumer’s aversion to salt in the diet. Thus, says BTA, per capita consumption of smoked fish will remain weak, even though several new products may stem the tide this year.

One area where fish is a growth product is fast-food restaurants. Catfish are catching on as a finger food you dip in a hot, flavored sauce. Since 1975, consumption of catfish has grown about 30% a year and now averages about three million pounds a week. A lot of that goes to fast-food outlets such as *Wendy’s* that compete with “chicken stores.” But some supermarkets

Frozen, convenient, high-quality seafood items are benefiting from the current consumer desire for “up-scale” food products.



21 or more
breaded fantail shrimp
with Chinese Mustard and Sweet & Sour dry sauce mixes

NET WT. 16 OZ. (1LB.) 453g—BREADED SHRIMP 14 OZ., DRY SAUCE MIX 2 OZ.

that carry it say catfish sales can run as high as 30% of all seafood sales.

Church's Fried Chicken rolled out Catfish Nuggets last Spring. Sisters Chicken & Biscuits, a Wendy's subsidiary, is the second chain to offer catfish. The new item is a premium-priced boneless fillet, breaded with a cornmeal coating and then deep-fried.

A major factor cited by BTA in explaining the overall slump in seafood sales is price. Seafood is no longer a low-cost protein, and it has suffered accordingly. Currently, seafood consumption is only about 5.8% of total animal-protein consumption. Furthermore, recent declines in red meat consumption have been replaced almost entirely by greater consumption of poultry. The future could be bright, however, says BTA. With both social and economic factors favoring its growth and development, the U.S. seafood industry could gain a much larger foothold in the American diet.

FROZEN FISH: BOOMING

Quality is the word for new products such as frozen fillets. General Host's Van de Kamp's seafood division initiated the move of major processing firms into the raw fillet segment by unveiling the *Today's Catch* product line, a box of three individually wrapped groundfish fillets. Other raw fillet products worth noting include General Mills' Gorton's of Gloucester Fish Market Fresh, Caribou's institutional and center-cut fillets and Coldwater and O'Donnell-Usen's Taste-O-Sea fillets and processed seafoods.

One of the latest items in this market is Mrs. Paul's new Fish Fillets Au Natural—Flounder, Haddock, Ocean Perch, Sole and Cod. These are "really" fresh-frozen fillets, the firm emphasizes—not portions cut from a frozen block—that are ready for cooking straight from the freezer. BTA expects total per capita consumption of fillets and steaks, up about 2.4% to 2.93 pounds in 1984, to grow about 2.0% per year over the next decade. And much of that growth should be in the fillet category.

Lately, the frozen seafood market has tightened and producers have become more aggressive. To maximize the convenience offered by these frozen products, for example, many new items—such as National Sea Products' High Liner Fish Fillets—can be heated in both microwave and conventional ovens.

There's been a surge in low-calorie prepared fish entrees (300 calories or less), too, sparked by the rapid success of Stouffer's *Lean Cuisine* line. Van de Kamp's *Lite Fish Entrees* is another example. All told, seafood entrees, about 25% of the \$1-billion frozen seafood market, grew by 32% last year. And Campbell's Mrs. Paul's grew with it.

"We've introduced a line of frozen *Light Seafood Entrees*," says George Pisek, vice president of marketing for Mrs. Paul's. The new completely microwaveable line contains such Elysian dishes as *Shrimp Primavera*, *Scallops Mediterranean*, *Fish Mornay* and *Fish Dijon*. All are 300 calories or less and contain no artificial ingredients.

At \$2.69 to \$4.29, Mrs. Paul's new entrees should attract consumers who appreciate the value of fish. But flavor is what Pisek is banking on. "We wanted entrees that are restaurant-quality, and that's what we created," he says. After only one year, Mrs. Paul's light seafood entrees accounted for 17% of the frozen seafood entree market.

(Continued on next page)



A trend to watch in 1986 is fiber-enriched snacks that can be eaten any time, even with regular meals.

Fiber in cereals just the beginning

The healthy human body needs 36 grams of dietary fiber each day. The average diet supplies 20 grams of dietary fiber; the rest comes from supplementation. But who will supply that extra 16 grams is still a question.

It might be cereal manufacturers. Nutrition and parental concerns power much of today's cereal buying, so cereals containing fiber and bran are gaining fans. New products in this category include *Fiber One* and *Bran Muffin Crisp* from General Mills, and *Extra-Fiber All-Bran* from Kellogg's. Meanwhile, after a slow start, General Foods is gaining in the fiber-cereal race. Last year, says GF, volume growth was strong for *Post Raisin Bran* (now renamed *Post Natural Raisin Bran*) and *Fruit & Fibre*. "In fiscal 1986," says a spokesman, "we're committed to creating more products like *Fruit & Fibre*." He notes that *Tropical Fruit* was added in fiscal 1985.

The fiber advantage may belong to cereals at the moment, but it needn't stay that way. Snacks such as granola bars are another option. And there's a lot to be said for getting your daily quota of fiber a little at a time, at every meal, rather than in one cereal bowl every morning. Thus, baked goods such as variety breads, rolls, cookies and crackers may turn out to be the best candidates for fiber enrichment.

At Food Expo '85, several highly functional vegetable fibers were touted for use in baked goods. National Grain Products Co., for instance, showed its *Barley Lite Bran Flour* that reduces calories as it boosts the fiber content. And Dupro Div., the Dumas Corp., demonstrated pea flour in a high-protein, high-fiber bread. Another exhibitor, Canadian Harvest, explained how its *Apple Ways* subsidiary offers a line of geriatric foods that include high-fiber crackers and cookies that are soft and easy to chew. That's possible because fiber-enriched cookies will absorb and retain moisture.



In frozen seafood portions, there's a move toward lighter, crispier coatings such as tempura and fried-type coatings. Mrs. Paul's *Crispier Crunchier* line of sticks and fillets, as well as their *Light and Natural* fillet line with lighter breadings, are examples of this trend. It appears, though, with consumers' growing affluence and penchant for quality goods, that lower-priced, high-volume items will not have significant market growth. Thus, for products that are not "intrinsically upscale," such as fish sticks and breaded portions, growth will be minimal over the next decade.

On the other hand, products that are inherently "upscale, such as shrimp and crab, can expect much better results. Increased canned oyster and clam production also reflect a growing demand. Even with these higher-priced species of shellfish, though, more of the catch will go to the fresh and frozen market.

POULTRY: UPWARD CURVE

Since the recession, poultry has been one area where the sales curve has been steadily upward. And there's no sign that it will turn down in the foreseeable future, although processors must be careful not to overexpand and bring on more intense competition and low prices. Already, observers have noted a slight drop in both margins and plant utilization.

The reasons for poultry's current success, notes Business Trend Analysts, include health and dietary considerations, lower prices, and the convenience associated with many poultry products. These factors have helped poultry cut deeply into the red meat and seafood markets.

Per capita consumption of chicken and turkey, still rising steadily, is now 68 pounds per

year, up sharply from 49.5 pounds a decade ago. In the same time frame, red meat consumption has slipped from 151 pounds to just under 140 pounds per capita. Moreover, breaded poultry chunks seem to be replacing hamburger and fish sticks as a cheap way to feed a family. And similar chicken products, made for dipping in a flavored sauce, are still hot items in fast-food outlets. In both cases, the batter/breading used helps to sell the product.

Processed poultry continues to outpace unprepared products, says BTA, and has now captured 20% of the market—double what it held a decade ago. The single fastest-growing product line is frozen boneless breaded chicken, with retail sales ballooning 71% from 1982 to 1984. Part of the reason for this surge was the rush of fast-food chains to add boneless items to their menus. Going a step further, *Sisters* is testing several new menu items—including baked chicken, which is supposed to be more healthful than fried chicken.

At retail, old-line frozen chicken-product processors such as Campbell's Swanson division are having a field day. Fried chicken sales from Swanson's *Plump & Juicy* line have been hot for years. But, in just the last year, sales are up 25%. "Sales of finger foods are up over 19%," explains Jim Van Stone, marketing director of Campbell's Poultry Business Unit. "And every indication is that they will keep on climbing."

Swanson uses chunks of chicken and no fillers in its *Plump & Juicy Cutlets, Drumlets* and *Dipsters*. And the seasonings are in the coatings, says Van Stone, so line variations are a simple matter. "We had such success with our regular *Chicken Dipsters* that we are now introducing *Italian, Herb, Barbecue* and *Coconola*, a crunchy coconut and granola coating."

The success of *Dipsters* for eating at home prompted ideas on eating *Dipsters* out, he adds. "We know people are taking them to work and microwaving them for lunch. We decided to offer the same hot-lunch alternative for convenience-store customers. Now, you can buy *Dipsters* and heat them in their own special box in microwave ovens at the store."

As Swanson keeps its eye on finger foods, it also keeps sharp tabs on the other entree possibilities. Thus, *Plump & Juicy Extra Crispy*, a line made with bread crumbs and 10 herbs and spices, is being introduced this fall. *Extra Crispy*, Swanson reports, is the first and only truly microwaveable fried chicken.

Part of the success of Swanson's product line comes from its R&D approach. "We pay a tremendous amount of attention to all aspects of consumer trends," says President Gordon McGovern. "We examine not only how consumers choose their foods and what they like, but what their lives are like. And we listen.

Consumer preferences in specialty restaurants

Specialty	% of all adults	Total market
Pizza delivery	40%	70 million
Amer. Regional	36	63
Pasta	35	61
Barbecue	34	60
Upscale burgers	33	58
Premium ice cream	32	56
Fresh-bake cookies	29	51
Diet or Lite items	26	46
Oriental fast food	25	44
Gourmet take-out	18	32
Mexican chicken	17	30
Cajun cookery	14	25
Display cookery	12	21
Sushi or Sashimi	7	12
Mesquite grilling	5	9

(Source: National Restaurant Association survey)

We've become very good listeners."

But knowing what consumers want and giving it to them are often two different things. In a large corporation, hot ideas often take years to get to a bubble, much less to a boil. Under the tutelage of McGovern, Campbell has prided itself on its ability to respond to consumer demands quickly without sacrificing quality.

FRUITS: FOOD OF THE '80s

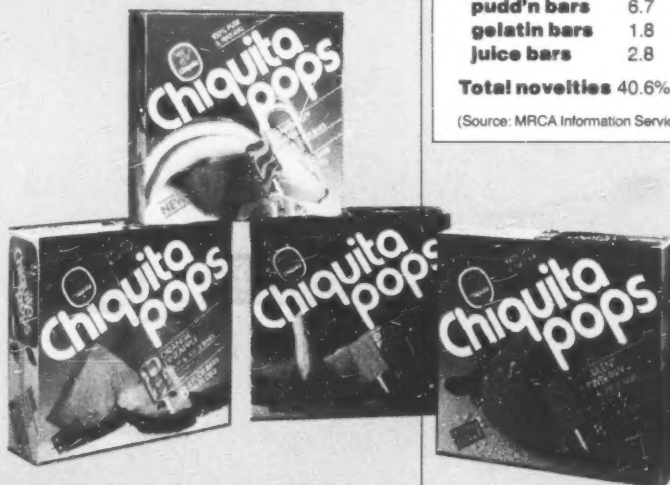
Fruit growers have done well recently. The emphasis on healthy eating has lifted fruit to the top of the "natural ingredient" list. You'll find it in cereals, snacks, sauces, juice drinks, etc. Moreover, the market for fruit juices continued strong in 1984, with consumption reaching 8.2 gallons per capita—an increase of more than 5% over 1983. The only worry growers have is keeping up with demand.

The fruit juice market is exploding. Dollar sales totaled \$4.5 billion at producer level in 1984, says BTA, an 8.4% jump over 1983. Frozen juices, about 38% of total juice consumption, brought in \$1.7 billion. Frozen concentrates continue, however, to lose ground to both canned and fresh juices. Demand for canned apple juice, for example, continues to grow sharply. Per capita consumption now stands at close to 9 pounds per year, says BTA, compared to 2.5 pounds per year a decade ago.

Ocean Spray has almost 13% of the canned and bottled juice market, reports *Food Industry Futures*, and they want more. The firm has developed *Mauna La'i*, basically a guava juice, and will probably introduce more tropical juice products. The competition is stiff, however. Dole, another force in the marketplace, is testing frozen and refrigerated pineapple juice and a new product called *Fruit Coolers*.

The increase in juice consumption parallels the rise of aseptically packaged fruit-juice drinks. Aseptic packaging, a new convenience,

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Frozen dessert specialties gained in 1984

Type	Gain	Change ('83-'84)
Sticks/bars	25.6%	-1.2%
popsicles	10.7%	-10.2%
choc-coated	15.2	+45.1
Cones	12.9	-6.4
Sandwiches	9.4	+38.5
New Items	10.3	+14.5
pudd'n bars	6.7	+3.7
gelatin bars	1.8	+344.4
juice bars	2.8	+71.9
Total novelties	40.6%	+4.7%

(Source: MRCA Information Services)

The cold truth about frozen foods

The \$11-billion frozen food industry showed mixed results for 1984. And some of the confusion can be blamed on both changing tastes and the trend to "natural" products. There's a move to more gourmet and ethnic entrees, microwaveable products, and to even greater convenience. Consumers are upgrading their meals, it seems, and actually making them into a status symbol. Thus, frozen specialties rose more than 4%, boosting the entire frozen category by 2%. But frozen fruits and vegetables, often commodity ingredients for lower-cost frozen dinners, fell about 10%. Yet sales of frozen brussel sprouts were up 31%.

In effect, the drab frozen dinner has been reborn as an upscale frozen specialty. MRCA Information Services reports that consumers—mainly young singles, one-person households and 2-career couples—are eating nearly four times as many premium frozen dinners as they were a year ago. "Consumers are searching for higher-quality in frozen foods," says MRCA's David Fencel, "and some may have found it in premium brands." Particularly successful are new lines of low-calorie frozen entrees aimed at one-parent families, working women, and moderate-to-upper income households. These include Campbell's *Le Menu* line, Swift's new chicken entrees, Pillsbury's *Green Giant*, and other new items from General Mills and Kraft. Even Blue Star Foods, the large private-label packer, has its own brand of calorie-controlled entrees.

Among other frozen specialties, novelties are the new boom category—particularly pudding, juice and gelatin bars, which have captured about 40% of the novelty market in the past two years. Even Chiquita Brands, a subsidiary of United Brands Co., is marketing 100%-natural *Chiquita Pops*—a new 4-flavor retail line of frozen fruit and juice bars. They're the beginning of what will become a full line of branded retail products. Chiquita Brands already has three more new products in development.

Other trends affecting frozen food sales include shifts toward finger foods and home cooking. As a result, says MRCA, sales of frozen beef patties have risen 95% since 1983, chicken patties are up by 30%, and French fries by 6%. At the same time, Salisbury steak dinners are down 29%, chicken pot pies have slipped 18%, and fish sticks fell 12%.



has virtually eliminated childrens' thermos bottles. Apparently, the boxed juices go to school with the kiddies, replacing chocolate milk, cocoa, *Kool-Aid* and a number of other made-at-home drinks. It's a one-way lunch now, with no metal lunch box to carry back home.

Over a dozen new aseptically packaged juices were introduced in 1984, ranging from the traditional orange, grape and apple juices to fruit nectars such as peach, apricot, guava and pineapple-banana. Although sales of these "boxed" drinks have hurt canned juices to some extent, the increased sales of aseptics more than offset the declines. According to one survey, the retail market for single-serving fruit juice drinks in bottles and cans is about \$280 million, while the market for aseptics exceeds \$400 million.

Meanwhile, consumer interest in natural, healthful foods has stimulated new entries in other juice categories. P&G's *Citrus Hill* orange juice, for instance, has lifted that entire category. Seven-Up's newly formed Foods Group has come up with *JuiceUp*, an exciting 5-item line of frozen lemonade and lemon-limeade concentrates that includes the first "diet" versions of juice concentrates. And Coca-Cola's *Minute Maid Country Style Orange Juice*, in both frozen concentrate and chilled forms, contains more juicy bits of orange pulp for those who want more texture in their juice.

There's also heavy action in fruit-juice blends, which reportedly grew 312% last year. Tree Top Inc. claims about 80% of this growth, which blossomed on the West Coast. Now, others are in the market with new blended products. One is *Juicy Juice*, from Libby, McNeill & Libby Inc. Another, from Coke, is *FIVE ALIVE Tropical Citrus Beverage*—a blend of five juices (orange, lemon, pineapple, tangerine and apple).

The public's thirst for fruit juices hasn't dimmed its taste for other fruit forms. New products to hit the market in 1984, according to *New Product News*, included: *Dole Fruit Sorbet*; *Dole Fresh Pineapple*; and *Birds Eye Apples For Baking*. Another "healthy" growth area for fruit products is in new snacks such as fruit rolls and fruit/granola bars. Some recent entries include: *General Mills' Fruit Bars* and *Carnation's Fruit 'n Nut Mixes*.

One of the newest fruit-snack lines comes from Del Monte. These dried fruit snacks, available both in resealable canisters and single-serve pouches, include fruit mix, yogurt-coated raisins, raisins and prunes. According to Stephen G. Rothschild, vice president of Del Monte's dry grocery and beverage products division, they "offer quick energy while delivering important vitamins and nutrients."

There will be even more fruit-based snack items in the future. Possibilities include fruit

jerky, pressings, spreads and crisps. The growing Oriental influence will bring on new products containing, for example, plum and fruit nectars. And the trend to flavored sauces will likely result in a wave of tropical finger foods such as "Polynesian Pork Nuggets."

PRODUCT TRENDS VARY

A complete, in-depth analysis of the thousands of new products introduced each year by the U.S. food industry is nearly impossible, even with the help of a dozen or so new-product bulletins and market research firms. In past years, *Food Engineering* actually counted these products—one by one—to discover which food categories were growing and what new types of foods were being offered. This year, we've tried to detect and explain some of the broad trends that cut across the food industry and either make or break products in many categories.

There are many, many food categories and virtually every one has outstanding new products worthy of mention. But, in the space available, we can only highlight a few. Here are some capsule summaries of these trendmakers:

In hot-beverages, reports *New Product News'* Martin Friedman, decaffeinated versions of major brands such as *Lipton Tea* and *Maxwell House Coffee* are new. General Foods has unveiled *Le Cafe Ground* and *Decaffeinated International Coffees*. And *Mr. Coffee*, the manufacturer of automatic coffee makers, is testing ground coffee under its own label.

Other new beverage products include: Pepsi's juice-containing *Slice*; Knudsen's *Recharge*; *Vitamin Delite*; *L.A. Beer*; *Alpenstein Malt Beer*; *Capri Sun Pouch-in-a-Box*; and *Canfield's Chocolate Soda*. Canfield's new soft drink, you'll recall, was widely imitated.

Elsewhere, the specialty cheese market is hot just now. "Kraft was very busy in 1984," says Friedman. "We counted 80 new Kraft items, including: *Velveeta Shells & Cheese Dinner*; *Velveeta Extra Thick Slices*; *Philly Frosting*; *Soft Philly Spreads*; *Lite Philadelphia Cream Cheese*; *Kraft Lite Mayonnaise*; *Sauceworks*; *Pour On The Cheese Topping*; *Thick 'n Spicy Barbecue Sauce*; *Cheese Classics*; *Touch of Butter Spread*; *Taco Dressing*; *Nacho Cheese Sauces*; and *Velveeta Mexican Style*."

The soup market is simmering, too. "Lipton has new reduced-calorie (*Trim*) soups, and *Cup-A-Soup* with crackers included," says Friedman. "They're also, again, after the Japanese-style ramen noodle soup business with their own Oriental line. On the West Coast, *7-Up* is testing freeze-dried *Nouvelle Soups*. And Campbell's new items include: *Coming Home*; *Creamy Natural*; *Chicken Broth*; *Chunky International*; *American Bounty*; *Fisherman's Chow-*

Ethnic Trends: Some Like It Hot!

The market for ethnic foods changes constantly. But an analysis of consumer preferences shows that "hot & spicy" items have the best chance for success. The trend to "hotter" foods is documented by the American Spice Trade Association, which says use of "hot" spices increased 45% since 1975. That explains the growth of Mexican, Indian, Szechwan, Hunan, New Orleans, Southwestern and other "hot" cookeries.

There's a hint of this in *Better Homes & Gardens'* "Report from the 1984 Consumer Panel." This survey of homemakers reveals that 85% enjoy regional or ethnic cooking, mostly Italian (74.7%), Mexican (57.2%) and Chinese (54.3%). And a preference survey of those who dine out, conducted by National Restaurant Association, showed pizza was still most popular—but that "hot" cookeries such as Oriental, Mexican and Cajun were a growing force.

Who's eating these hot meals? NRA says young adults (18-34) are most likely to try them. And an MRCA Information Services study shows frozen ethnic entrees doing well with young singles, who eat five times as much lasagna and burritos as the rest of us. MRCA also says that women eat more than twice as many ethnic frozen dinners as men, three times as many frozen bagels, and twice as many frozen croissants. There's also a growing demand for premium frozen dinners and low-calorie ethnic products.

MRCA's data shows that upscale items seem to do best. Specialty breads are up sharply, for example, croissants by 161% and French bread by 34%. Lasagna, a difficult meal to prepare at home, is up 66%. Meanwhile, some non-status products are losing ground. Bagels, for instance, up 600% since 1978, were down 47% last year.

der; Cookbook Classics; and Today's Taste."

Some other new products Friedman cites as outstanding are: *A La Mousse; Hebrew National Pickles; So Fresh Golden Potatoes; Birds Eye Sugar Snap Peas; General Foods Beau Village Cheeses; and Land O' Lakes Bread.*

New products offering nutritional benefits were less numerous last year, says Friedman. Entries featuring low-calorie/low-sugar content included: *Celentano Pasta Entrees; Lite Frosting; Carnation Diet Supplement; Nestle's Aspartame Quik; and Ralston Sun Flakes.* Low-



sodium products included *Mrs. Dash's Steak Sauce and Coating Mix*, and *Kellogg's Raisin Bran*. In the low-fat/low-cholesterol class, there was *Rich's Refrigerated Pream*. And, for high-fiber content, there was *Kellogg's All-Bran* and *Cam-Tag's Sun Harvest Bread*. One problem with "nutritious" foods is making the image fit the product. General Foods has made some label changes with that in mind, changing *Super Sugar Crisp* to *Super Golden Crisp*.

A new factor in the nutrition area is the many new tofu-based items on the market. "Tofu desserts like *Tofutti* and *Tofulite* are doing extremely well," Friedman says. "There's an aseptic tofu drink, called *Ah Soy*, and even a 'Tofu-Helper' type product, called *Lite Chef*."

While people talk about nutrition, however, what they buy is convenience. The portion of the consumer market that buys convenient, upscale products such as premium frozen dinners and ethnic entrees grew 5% last year—while the nutrition-conscious portion who buy fiber-rich breads and low-fat milk dropped 1%.

The demand for convenience is evident in microwave oven sales, too. So food marketers such as Swanson's have redesigned their frozen products to make them microwaveable.

The popularity of fast-food breakfast items illustrates this growing need for convenience. Breakfast sandwiches rank third among fast-growing menu items. And French toast ranks ninth. Among new retail products combining quality and convenience we find *Green Giant Stuffing Originals*, a line of frozen bread stuffing products that would be hard to duplicate at

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Ethnic Foods Preference

Type	Serve family	Prepare most
Italian	74.7%	35.8%
Mexican	57.2	17.7
Chinese	54.3	11.3
Southern	31.3	7.4
German	24.1	2.1
Tex-Mex	16.6	3.2
French	12.9	0.0
Polish	12.9	2.3
New Eng.	12.6	2.3
Japanese	9.4	0.7
Spanish	8.5	0.2
Pa. Dutch	8.0	1.6
Greek	7.1	0.0
Cajun	6.9	1.4
Far East	5.3	0.2
Scand.	5.1	1.1
Arabian	3.2	0.0
Indian	2.8	0.0
Other	2.3	0.5
No Answer	4.8	12.2

(Source: "Better Homes & Gardens Inquiry on Food: A Report from the 1984 Consumer Panel")



Made for both microwave and for conventional ovens, these frozen meals combine quality and low-cost.



home. The idea is similar to the frozen, flavored rice dishes that come in boil bags.

Also, in frozen foods, consumers are buying fewer frozen commodities and much more frozen specialties. In 1985-86, shipments of frozen foods should grow 5.4% along with demand for low-calorie, high-nutrition frozen entrees.

The changing mix of frozen products can be seen in this year's frozen potato pack. An American Frozen Food Institute survey shows nearly 2.5 billion pounds of all styles of potatoes were frozen in the first six months, and more than 2 billion pounds of this were French fries. Another 415,434,000 pounds included hash-brown products, puffs, patties, cottage fries, whole-peeled, diced and baked styles. This sort of growth in new product forms tends to enlarge the entire category.

TREND TO WATCH

The future may belong to vegetarians—a growing trend around the world. As people shy away from meats and other “bad” products, they may turn to fruits and vegetables as an alternative—rather than to other forms of meat. Consumption of fresh fruit jumped from 60% to 65% between 1978 and 1983, for example, and that trend is expected to continue.

The trend to “fresh and natural” products would seem to support this concept. Several firms, including Campbell's, are now marketing fresh produce that's quality controlled, packaged and branded. The consumer's desire for fresh food with reliable quality also has led to a new era of fresh, refrigerated meals. What was just a salad-making industry a few years ago is fast becoming a force to be noted. And it goes beyond factory preparation of packaged meals. There are a growing number of “take-out” operations which provide hot and homecooked gourmet meals for busy people. This idea started in the 1960s, when *Meals on Wheels* began delivering hot food to senior citizens.

Another sign is the increase in vegetarian platters being offered by some industrial cafeterias, and the continuous rise in cheese sales. There is some concern by nutritionists, however, about the rise in cheese consumption. Cheese is high in cholesterol, which is “bad” for you. So, expect more new cheese products that contain no cholesterol. It's likely that some new cheese products also will be calcium-enriched to ease a health problem among older women.

Microwaves—the new American cookery

In the U.S., microwave ovens are becoming a way of life! About 60% of U.S. homes now have a microwave. And, according to *Better Homes & Gardens*' “Inquiry on Food: A Report from the 1984 Consumer Panel,” the longer you own one, the more you use it. About 80% of these ovens are used every day to heat leftovers, light lunches or snacks, to cook part of a main meal, and to defrost food. They're used mostly at dinnertime, but also are handy for baking and to heat beverages. Also, though few owners (only 13.6%) cook entire meals in microwaves, nearly 55% say they will use a microwave oven to cook a quick meal when time is important.

This rapid growth in microwave ownership is a golden opportunity for premium-quality frozen dinners, suggests a study from MRCA Information Services. “For some foods,” says publisher David Fencil, “microwaves account for 88% of all preparation.” The fastest-growing category of microwave owners, he notes, is Singles and Grandparents, with penetration among both groups more than doubling between 1982 and 1984.

Even before the figures on microwave usage crossed the 50%-ownership mark, however, food processors were in the market with everything from microwave popcorn to quick-heating pizzas. *Budget Gourmet*, a line of lower-cost frozen meals in dual-ovenable paperboard packaging, is one industry response to this changing consumer pattern. Pre-browned sausages for microwave reheating is another. And *Swanson Great Starts Frozen Breakfasts*, which heat in a few minutes in a microwave compared to 20 minutes in a conventional oven, are upscale convenience products aimed at this growing consumer segment.

The MRCA study also shows a still-growing market for other microwaveable foods and beverages. Likely targets for food product developers are new items for breakfast, lunch and snacks. Of these, new breakfast products may have the greatest growth potential.